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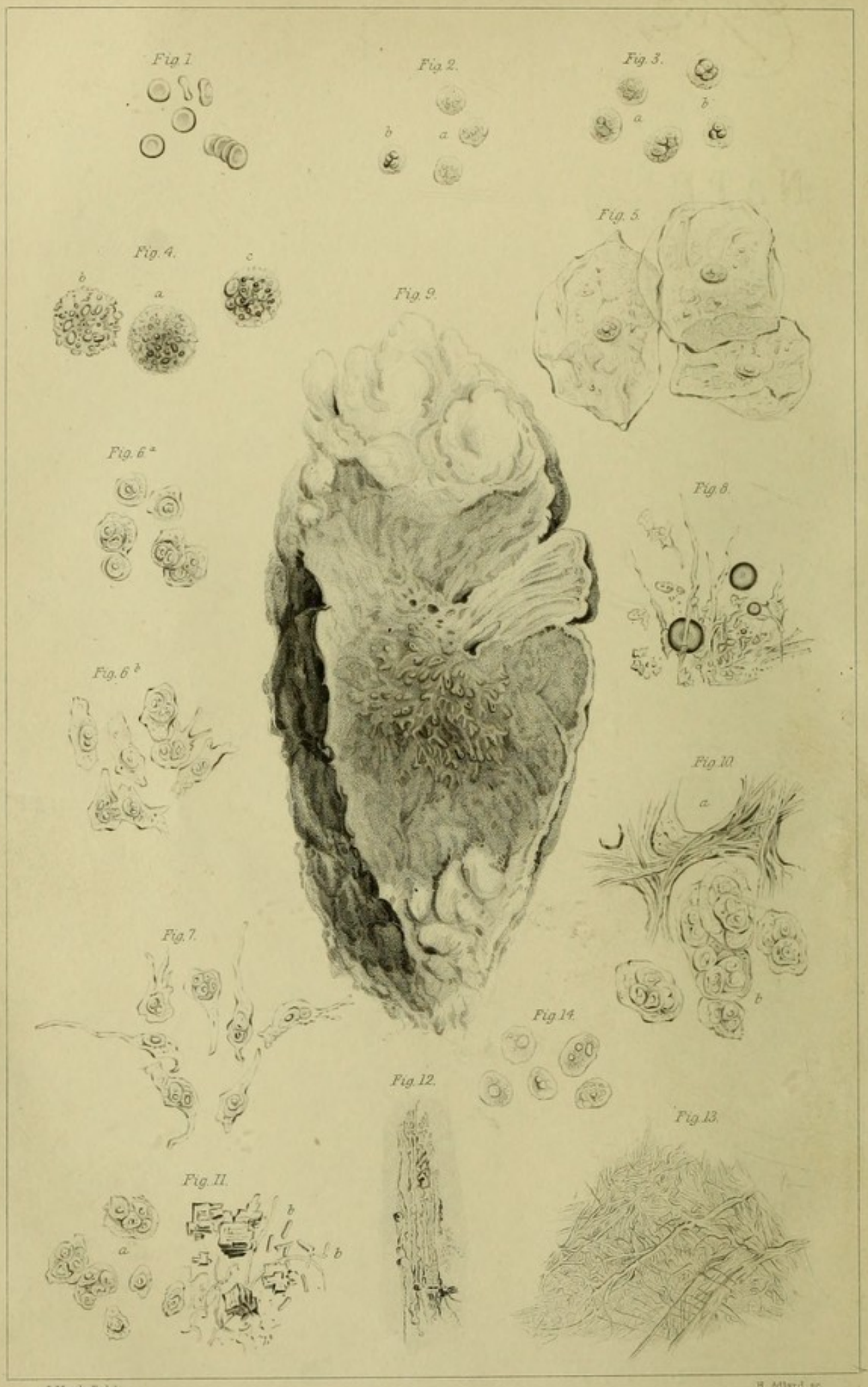
THE

NATURE AND TREATMENT

OF

CANCER.



J. Marshall del.

H. Allard sc.

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THE

NATURE AND TREATMENT

OF

CANCER.

BY

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PREFACE.

In discussing the general history of Cancer (to which the First Part of the following work is devoted) I have adopted a novel plan, calling, perhaps, for a few words of explanation. I had scarcely commenced the study of Adventitious Products, before I became convinced that much of the obscurity pervading the subject arose less from its nature, than from the erroneous manner in which its investigation had been conducted. I found observers had overlooked the fact, that the higher orders of these Products were real existences developed within existences, and possessed of two distinct modes of life:—a life, subject to its variations of health and disease, irrespective of the organism in which they had taken birth; and a life influenced by the conditions of the various structures and functions of that organism. I saw that phenomena, accessory and contingent, were confounded with others necessary and essential; and that, as a natural consequence, misapprehension of many pathological relations had followed. Desirous of removing this source of unsound doctrine, as it affects the most important of Adventitious Growths, Cancer, I have separately considered (on the plan habitually employed in my Lectures) the healthy and diseased conditions of vitality of that product.

The fulness of detail with which I have entered into the examination of questions regarding treatment will, I trust, afford ample proof of my earnest anxiety not to suffer even a plausible suggestion, much less any obviously useful plan, proposed for the cure or relief of the disease, to escape my consideration. And it is en-

couraging to the future labours of the therapeutist to know, that, if sage experience have proved the deficiency of any special remedy, that same experience justifies a higher estimate of the powers of art in controlling the progress of the malady, than it has for some time been the tendency to form.

I have patiently sought out all available evidence bearing upon the propriety of extirpating cancers, as a means either of curing the disease, or of ensuring advantages of a less substantial character. Impressed with the importance of the question for the interests of humanity, I have soberly and dispassionately undertaken the task of scrutinising that evidence; and, if the result be of somewhat an unexpected character, it has at least, I may venture to observe, that claim to attention possessed by all unprejudiced inductions from experience.

In the descriptions of Cancer, as it infests different structures and organs (forming the subject of the Second Part of the work), the disease is principally considered in its practical characters, and an endeavour made to exhibit these, as they are observable at the bed-side. In connexion with the diagnosis of the disease in each organ, is given a synopsis of the signs and symptoms, whereby every affection to which that organ is liable, may, with more or less surety, be clinically distinguished from cancerous disorganisation.

It has been my constant aim to render scrupulous justice to the labours of those who have engaged in similar investigations. No matter how trivial the fact, or how obscure the name of him who may have noticed it, I have, as far as my information permitted, attributed its establishment to its earliest observer. I have done this even in regard of no few points and inferences, which had directly flowed from my own observation. I am aware that my work must for this reason have less of an original aspect than I might, with but a small share of the cases and facts I have collected, and without actual unfairness to any one, have readily given it. But the sacrifice, if such it may be called, (and the habits of the day would certainly justify the use of the term,) has been to me a most pleasing one.

I should not do justice to my feelings, were I not to express my acknowledgments for the flattering reception with which the article Cancer in the Cyclopædia of Surgery (the foundation of the present work) was honoured by the Profession. To Dr. Mason Warren, under whose able supervision the American edition was produced, I am under especial obligation. My best thanks are due to numerous friends who have forwarded me specimens of morbid growths for examination; and likewise to Mr. John Marshall for his accurate and finished delineations of the objects represented in the Plate.

Upper Charlotte Street, Fitzroy Square,
November, 1845.

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EXPLANATION OF THE PLATE.

[All the objects in this Plate, with the exception of Figs. 9, 12, 13, and 14, are magnified 400 diameters.]

1. Red corpuscles of the blood, seen on the flat surface, laterally and in rolls. Diameter = $\frac{1}{3500}$th to $\frac{1}{3400}$th inch.
2. White or colourless corpuscles of the blood.—*a.* in the natural state, diameter = $\frac{1}{2800}$th to $\frac{1}{2600}$th inch ;—*b.* a single corpuscle treated with dilute acetic acid (about 1 part of acid to 5 of water), showing the tripartite nucleus.
3. Pus corpuscles.—*a.* three in the natural state, diameter = $\frac{1}{2300}$th to $\frac{1}{2000}$th inch ; —*b.* two corpuscles treated with dilute acetic acid, one showing a tripartite, and the other a quadripartite nucleus ; under the action of the acid, the diameter is slightly diminished.
4. Compound granule corpuscles.—*a.* in the natural state, diameter = $\frac{1}{1330}$th to $\frac{1}{1100}$th inch ;—*b.* corpuscle about to undergo rupture; the involucrum becoming more transparent ; and the granules larger, darker, and more prominent ;—*c.* a corpuscle treated with dilute acetic acid ; the involucrum being rendered transparent, the granules more evident, and several NUCLEI appearing in its interior.
5. Epithelium scales from the Mouth (of *medium* size).—Diameter = $\frac{1}{350}$th to $\frac{1}{400}$th inch. Diameter of nucleus = $\frac{1}{3500}$th to $\frac{1}{3000}$th inch.

6[a]. Encephaloid (fresh) from the Stomach.—Spherical nucleated cells in different stages of development. Some of the cells young, with the nucleus single and large in proportion to the size of the entire cell. In others the nucleus has divided, and the cell is of larger relative size. Diameter = $\frac{1}{2000}$th to $\frac{1}{1500}$th inch. Diameter of nuclei = $\frac{1}{3500}$th to $\frac{1}{3000}$th inch.

6[b]. From the same specimen as 6[a].—Nucleated cells of irregular form, all more or less elongated, and beginning to branch out. Nucleus single or double. Dimensions : Length $\frac{1}{1500}$th to $\frac{1}{1000}$th inch ; width $\frac{1}{2500}$th to $\frac{1}{2000}$th inch.

7. From the same specimen.—Caudate nucleated cells of various forms. Nuclei more or less compound. Dimensions : Length $\frac{1}{1000}$th to $\frac{1}{500}$th inch ; width $\frac{1}{2500}$th to $\frac{1}{2000}$th inch.
8. From the same specimen.—Broken granular matter; fibrils; and three globules of oil of different sizes. The granules vary in diameter from $\frac{1}{5000}$th to $\frac{1}{10000}$th or $\frac{1}{15000}$th of an inch.
9. Vertical section of carcinoma of the Breast ; exhibiting enlargement of the lactiferous ducts, with thickening of their walls. Some of the ducts are cut across transversely, others longitudinally. [University College Museum : size of nature.]

10. Colloid Cancer, from the great omentum. The specimen had been some years in spirit; some allowance is consequently to be made for corrugation.—(*a.*) A portion of the fibrous structure, as seen in the walls of the loculi, in which the compound clusters of nucleated cells are deposited. The loculi here partly shown are not more than one-third of the more common size. (*b.*) A cluster of compound cells, fitting the lower loculus, in which the successive encasement of cells is seen. Diameter = $\frac{1}{1600}$th to $\frac{1}{900}$th inch.
11. From the same specimen.—(*a.*) Compound cells, also showing the encasement; and some of the smallest single nucleated cells free. Diameter of the single cells $\frac{1}{2500}$th to $\frac{1}{2000}$th inch. (*b.*) Saline crystals, in plates (compound) and in needles. (See p. 82.) Curled fibrils, and minute granules.
12. Fibrillar structure set with granules, from a specimen of fasciculate cancer of the Female Breast.—These fibres (so pale that in order to be distinguished they require to be looked at in shadow) are of the same diameter as those of cellular tissue. [After Müller.] This specimen differed from the one described in the text (p. 58) in being unassociated with cells.
13. Stroma of scirrhus, as seen after maceration of the growth. [After Müller.]
14. Spherical cells from scirrhus of the breast; some of them containing several granules without a nucleus,—others a single larger nucleus-like corpuscle. [After Müller.]

THE

NATURE AND TREATMENT

OF

CANCER.

INTRODUCTION.

ON THE NOSOLOGICAL POSITION OF CANCER.

The existence of disease is manifested, and its essence constituted, by perversion of function and alteration of structure. Disease is, in other words, signified by dynamic or functional, and material or organic deviations from certain standards, known by experience as those of health. In the great majority of diseases both species of change are associated; in none does organic aberration remain, for any length of time, unattended with functional disturbance. But diseases do occur in which, while disordered action is obvious, no evidences of structural modification are appreciable; and it is assumed by some pathologists, that the inability in such cases to detect organic change arises, not from the imperfection of means and methods of investigation, but from the absolute non-existence of any such alteration. In pursuance of this assumption is founded the class of Functional or Dynamic Diseases.

Now, though all analogy depose against the real existence of such functional diseases,—though reason teach us to discredit the possible continuance of functional disturbance in organs constructed of solid and fluid elements having the attributes of positive health, that is, to discredit the possibility of a perfect instrument pursuing a system of imperfect or perverted action,—though growing knowledge reduce from day to day the number of such alleged diseases, by assigning many of them their places in the organic class,—though the power of detecting minute variations of structural condition have in many instances attained precisely to the point of justifying the inquirer in more than suspecting an organic change, which it fails to demonstrate;—though all this be true, still the

pathologist who recognises Observation as the only sound basis of his science, cannot at the present day refuse Dynamic diseases a place in his nosology. He accords them that place for the simple reason that demonstrative evidence of their non-existence has never yet been obtained.

Certain maladies are, in truth, even now, as matters of Experience, combinations of disordered actions alone. A scheme of nosology, founded on experience, must consequently comprise two great groups of diseases, Functional and Organic.

Functional diseases are those in which disturbed action is not demonstrably dependent on, or connected with, physical or chemical change in the fluids or solids.

Organic diseases are those in which such change in the fluids or solids constitutes a demonstrable element in the unnatural state present. These changes affect either Form, or Composition and Texture, separately or conjointly. With diseases implicating Form rank all varieties of Congenital Malformation and Acquired Changes of Configuration. Textural diseases, those involving composition, are, on the other hand, signified either, first, by change in the physical or chemical attributes of the natural elements (be these solid or fluid, essential or contingent) of the frame; or, secondly, by the addition of some new material, either structureless or organised, to the original and fundamental tissues.

To the first of these two possible forms of modification of composition are referrible Primary Molecular Changes of the Solids, and various Altered Conditions of the Blood. The existence of the second announces the evolution of an Adventitious Product.

Primary Molecular Changes are simple or composite. Of the simple species, Rarefaction, and Condensation, Atrophy, and Hypertrophy, may be adduced as instances; Inflammation exemplifies the composite species; while Softening and Induration are among those which belong, according to circumstances, to one or other species. Of Altered Conditions of the Blood, excess or deficiency of the red corpuscles supplies a sufficient illustration.

Upon the nature and affinities of Adventitious Products it will be necessary to dwell somewhat more fully. An Adventitious Product I understand to be any substance which, produced by or originating in connection with the organism, neither forms part of its natural structure, nor results from its healthy manifestations of activity; while, at the same time, it differs more or less completely, in many or in few qualities, from all the natural constituents of the frame.

Adventitious Products, thus defined, resolve themselves naturally into two great classes; those composed of materials Physiologically Inorganic, or Physiologically Organic.

The class of products Physiologically Inorganic includes those formed of matter chemically inorganic, and also those which, though organic in a chemical point of view, are nevertheless completely destitute of structure or organisation. The class of products Physiologically Organic comprehends all that are possessed of that special arrangement of molecules characteristic of organised existences, and known as structure.

Physiologically Inorganic Products comprise some which are (*a*) produced by precipitation from secreted fluids; and others (*b*) which are exuded ready-formed from the vessels. Among the former are found, for example, saline matters presenting themselves under the forms of crystals, pulverulent deposits, calculi and concretions: to the latter division belong certain proximate principles, which are either incapable by nature of assuming structure, or rendered so accidentally by the special circumstances of their origin; as, for instance, oils, sugar, albumen.

Physiologically Organic Products include all those which are possessed of organisation—in a word, Formations; and are divisible into two sub-classes. In one of these, the adventitious Formation depends for existence on the immediate and direct access of nutritious matter from the blood of the parent organism: in the other, the new Formation is not dependent for its continued being upon such immediate and direct access. Products of the former sub-class originate from a structureless fluid or blastema; they may be termed Blastemal Formations: those of the latter spring from a germ, and may be called Germ-Formations or Parasites.

Blastemal Formations are essentially characterised by cell-structure; and upon the attributes and end of the cells composing them may be founded a perfectly natural arrangement of the whole sub-class.

First, a blastemal fluid may generate cells altogether inapt for life, and incapable either of undergoing such change in physical and chemical constitution as shall qualify them for sustaining a permanent existence, or of effecting the generation of new cells previously to their own destruction. They are consequently acted upon physico-chemically by the materials around; that is, they are either dissolved by the fluid with which they are associated, or disintegrated and crumbled down into granular or amorphous matter, and lose all trace of the attributes of organisation. Cells of this class

may be termed Evanescent and retrograding, and the Formations they constitute, Deposits.

Secondly, the primary cells may be possessed either of the power of actually generating, or of indirectly causing the generation of, new cells, previously to their own destruction,—cells endowed in their turn with a similar generative force. To this order of cells the title of Non-permanent and indefinitely vegetating may be applied; that of Growths to the Formations they produce.

Thirdly, the primary cells may possess an inherent faculty qualifying them for the formation of tissue more or less closely resembling the natural structures, and in this condition of transformed or evolved cells they are destined permanently to remain. These cells appear likewise to be destitute of the power of producing, or causing to be produced, cells similar to themselves. They may consequently be termed Persistent, non-vegetating cells; and the Formations composed of them Pseudo-tissues.

To speak at present of the order Growths alone:—

The materials composing these are in the greater number of instances accumulated in some point or other of the body, in which they gradually increase in quantity, and, in proportion to this increase, push aside the structures among which they are developed. But there are certain Formations of this class, which, while they act on the tissues in the manner just referred to, tend also to spread amid the elementary molecules of those tissues, to cause atrophous destruction of existing particles, and prevent the evolution of similar new ones. Such is the nature of the process known as infiltration,—a process to all appearance simulative in its effects of conversion or transformation of the original tissue into material identical with that of the new Growth.

From the absence or existence of this infiltrating property, which experience teaches us to recognise as fundamentally important, a subdivision of Growths into Non-infiltrating and Infiltrating necessarily follows.

I shall, as I trust, be enabled satisfactorily to prove, in the course of this work, that a single genus of formation represents the subdivision of Infiltrating Growths. This genus is Cancer. It comprehends some important species, agreeing in essential characters, both as respects their mutual similitude, and their dissimilitude to Non-infiltrating Growths.

Such then in the scheme of disease is, it appears to me, the position held by Cancer. The nature of this position is, perhaps, made more clear by the subjoined table, than by the brief exposition to which I have here been obliged to limit myself.

- GROUP I.
  - FUNCTIONAL DISEASES.
- GROUP II.—ORGANIC, OR MATERIAL DISEASES, characterised by
  - § I. ALTERATIONS OF FORM.
    - A. Congenital.
      - Malformations.
    - B. Acquired, affecting
      - Attitude, Shape, Situation, Size, Number,
      - Capacity, Continuity, Contiguity, Connection.
  - § II. ALTERATIONS OF COMPOSITION, OR TEXTURE.
    - Constituted by change of natural constituents.
      - Essential:
        - Solids.
          - Primary Molecular Changes.
            - Simple,
              - Rarefaction,
              - Condensation, &c. &c.
            - Composite, Inflammation, &c. &c.
            - Either,
              - Softening,
              - Induration, &c. &c.
        - Fluids.
          - Alterations of Blood, Chyle, Lymph, in respect of Quantity, Quality, Position.
      - Contingent: Secretions.
        - Gaseous, Fluid, Concrete, altered in Quantity, Quality, Position.
    - Constituted by addition of new matter: Adventitious Products.
      - CLASS I. Physiologically Inorganic: PRECIPITATES.
        - From the Secretions: *Chemically Inorganic.*
        - From the Blood: *Chemically Organic.*
      - CLASS II. Physiologically Organic: FORMATIONS.
        - SUB-CLASS I. Products possessed of dependent existence, and derived from a blastema: *Blastemal Formations.*
          - A. Derived from a blastema which generates cells deficient in vegetative faculty and in permanency: *Deposits.*
            - *a.* Pus.
            - *b.* Tubercle.
            - *c.* Colouring matters.
          - B. Derived from a blastema which generates cells possessed of vegetative faculty, but deficient in permanency: *Growths.*
            - (*a*) Deficient in the power of destroying by infiltration the natural tissues amidwhichthey are evolved: *Non-infiltrating growths.* — Fibrous Growths, Enchondroma, &c. &c.
            - (*b*) Possessed of the above power: *Infiltrating Growths.* — CANCER.
          - C. Derived from a blastema which generates cells deficient in vegetative faculty, but possessed of permanency: *Pseudo tissues.*
            - Pseudo-cellular tissue.
            - Pseudo-fibrous ,,
            - Pseudo-osseous ,,
            - &c. &c.
        - SUB-CLASS II. Products possessed of independent existence, and derived from a germ: *Germ-formations*, or *Parasites.*
          - Animal.
          - Vegetable.

From this table (which is only completed in respect of its chief divisions, as I have thought it enough for my present purpose to illustrate the nature of the various sub-divisions, by adducing one or two of the special conditions appertaining to each) it follows that, anatomically considered, Cancer is an Infiltrating Growth, occupying a certain position among Adventitious Blastemal Formations. But, as it scarcely needs to be added, such has not always been the meaning attached to the term. Few words, indeed, have undergone more repeated changes of signification; and a concise review of the more important of these changes, connected as they have commonly been with modifications in opinion concerning the nature of the disease, will not be devoid either of interest or instruction.

The word Cancer appears to have been originally applied by the Romans to the conditions termed gangrene and sphacelus by the Greeks; while the term carcinoma was employed to designate the affection known by the moderns as cancer:* at a later period, however, authors used it as a synonym of carcinoma or carcinos (καρκίνωμα, καρκίνος). It could serve no useful purpose to inquire whether the fanciful pathologists of early times fixed on this name for the disease because they discovered a resemblance in the tumor and surrounding dilated veins to the body and claws of the crab; or because they actually believed that an animal devoured the ulcerating parts; or because, as some will have it, they simply wished to convey symbolically an idea of the loathsome character of the complaint: perhaps all three considerations influenced them in its selection. Whatever was the motive in thus naming it, the affection itself was at first presumed to be peculiar to the breast; but, in proportion as morbid states of similar character were found to occur in other parts, they were included under the same general title. Thus we find Paulus ab Æginâ, in imitation of certain of his predecessors, defining cancer, a hard irregular tumor, with or without an ulcer, occurring in any part of the body, but most frequently in the mamma.†

The disposition to systematise was soon displayed. Early observers, struck forcibly by the difference of symptoms in the ulcerated and non-ulcerated stages of the disease, considered it expedient to mark this by a distinction of names; they accordingly restricted the application of the word cancer to the former state, and appropriated the term scirrhus to the latter. By a further refinement the scirrhous stage was subdivided into two, the simply scirrhous, and the occult cancerous;‡ the supervention of pain being

* Parr, Dictionary in voc. † Lib. vi. cap. 45. ‡ Hippocrates.

the signal for the change of name. More modern systematists, turning the word carcinoma from its etymological signification, distinguish it from cancer by limiting it to painful scirrhus.

Further, the extreme similarity of some characters of the morbid product now known as encephaloid, to those of carcinoma, led, at a much later period, to the pretty general adoption of the term *soft cancer* for that disease—a new application of the word subsequently resisted by Abernethy and Mr. Wardrop on the grounds of the equally manifest differences subsisting between the two formations. In 1812, however, a distinguished French pathologist, Bayle, recognising more fully than his predecessors the fundamental similarity of soft and hard cancer, of encephaloid and scirrhus, without by any means underrating the importance of their individual peculiarities, maintained the propriety of designating them by the same general name. Unfortunately he marred the excellence of his suggestion by including among cancerous diseases all cutaneous ulcerations of an intractable character: by thus grouping under the head cancer affections essentially dissimilar, though agreeing in the single important attribute of intractability, he contributed materially to engender the state of uncertainty even now observable in certain foreign works, regarding the mode of application of the term.

To our countryman the late Dr. Young, therefore, belongs in reality the merit of having been the first to unite scirrhus (*carcinoma scirrhosum*) and encephaloid (*carcinoma spongiosum*) as species of a genus, cancer or carcinoma. But his example has been very slowly followed. English writers, with the exception of Mr. Travers, more keenly perceptive of the differences than of the analogies of these products, have almost to the present day continued to define cancer as ulcerated scirrhus, and separate encephaloid completely therefrom under the titles of medullary sarcoma, fungus hæmatodes, fungoid disease, &c. Nevertheless, opinion had been silently undergoing a change among us; we had been gradually learning to recognise the practical truth and importance of Dr. Young's nosological arrangement, when Dr. Carswell deprived us of all excuse for wavering by satisfactorily proving its justness.

But this is not all. The inquiries of Laennec, followed up by those of several of his contemporaries and successors, distinctly established the close alliance of another morbid formation, originally described by that acute observer under the title of *tissu* or *matière colloïde*, to scirrhus and encephaloid. However, great doubt and difference of opinion subsequently arose as to the precise degree of relationship of the former to the two latter products. Laennec

erred seriously in associating with true colloid structure all adventitious matters having a gelatiniform appearance; other persons, not unskilled in morbid anatomy, falling into the opposite extreme, denied the cancerous character of any form of colloid; while medium opinions of various kinds were likewise promulgated. None of these appearing to me consonant with observation, I some few years past ventured to assign to colloid the rank of a species in juxtaposition with scirrhus and encephaloid.* The additional experience I have since acquired has still more fully convinced me of the correctness of the views on which this arrangement was founded; and I have further had gratifying testimony to its accuracy in its adoption by eminent observers in this country, on the Continent, and in the United States.

The union of these three morbid structures into a distinct genus is, in truth, not a mere nosological artifice: it is manifest that the formations, to which I thus apply the generic term cancer, possess characters entitling them to be grouped together, and separated from all others to the generation of which the organism is exposed. They agree *anatomically*, for they are all composed of elements forming a combination without its counterpart, either in other adventitious products or in the natural structures; they agree *chemically*, for they are all distinguished by the vast predominance of protein-compounds in their fabric; they agree *physiologically*, for they all possess in themselves the power of growth and of extending by infiltrating surrounding tissues, and so producing an appearance of assimilating to their proper substance the most heterogeneous materials — an inherent tendency to destruction, and the faculty of local reproduction; they agree *pathologically*, for they all tend to affect simultaneously or consecutively various organs in the body, and produce that depraved state of the constitution known as the cancerous cachexia. Their title to be united is quite as strong in respect of practical medicine and surgery, as in respect of scientific pathology; a consideration of the very highest importance.

Another doctrine, which will be elsewhere examined,† has been advanced with regard to the degree of relationship subsisting between these adventitious formations. It is contended by some authors, that, although each of them acquires individual peculiarities with the progress of development, still they are primarily not merely allied growths, but actually one and the same morbid structure. Without inquiring, for the present, into the validity of this opinion,

* Cyclopædia of Surgery, art. Cancer, vol. i. p. 592. 1840.

† See Part I. Chapter VI. Sect. I.

it will suffice to state here, that I shall describe them as distinct productions; and this because, when in their respective stages of full development,— that is, when they possess their individual qualities in the highest degree,—the three species possess such general differences of appearance, and exhibit such variance in pathological characters, as to render such separation (even if otherwise unwarranted) matter of necessity.

As respects the name to be given to the genus, cancer or carcinoma is clearly the best; and I maintain the propriety of applying these terms to all three species in every stage of their existence, before as after the occurrence of softening, and whether ulceration have or have not set in. I shall follow this plan throughout the following work,—distinguishing when requisite the absence or presence of those states by the appropriate adjectives. For, on the one hand, to limit the term cancer (as is still constantly done) to one particular structure, scirrhus, when others (some in a more, some in a less, marked manner than itself) possess the very properties to signify which the word was originally devised and employed, not only amounts to a contradiction in language, but involves a serious error in pathology. And, on the other hand, it is not only absurd, but likely to be productive of practical ill-consequences, to distinguish by different names two tumors which are identically the same in composition and tendencies, and differ only in the accidental circumstance that ulceration has not yet commenced in the one, while it has already made its appearance in the other. The tubercle of phthisis is thus styled, whether ulceration have or have not occurred; a fibrous tumor does not cease to bear the name, if a process of disintegration have arisen in its interior.

I shall close these introductory remarks by a tabular synopsis of the species and varieties of cancer which I conceive it advisable to recognise; to these I have affixed a list of synonyms under which the species have been described by different writers. The comprehension of not a few works will, it is hoped, be facilitated by reference to this list; and the dismay, naturally felt by readers on encountering in each new treatise one or more names of morbid formations seemingly distinct from all those they had previously become acquainted with, be in some measure dispelled, when they ascertain that such diversity of *names* by no means implies a corresponding diversity of *things*.

Family.	Class.	Sub-Class.	Order.	Genus.	Species.	Varieties.	Synonyms of the Species.
Adventitious Products.	Formations.	Blastemal Formations.	Vegetative Cell-Formations, or Growths.	Infiltrating Growths: CANCER, or CARCINOMA.	ENCEPHALOID, or soft Cancer.	*a*. Mastoid Cancer. *b*. Solanoid „ *c*. Milt-like „ *d*. Nephroid „ *e*. Fasciculate „ *f*. Hæmatoid „ *g*. Fungus Hæmatodes.	Spongy, or ossivorous tumor. RUYSCH [1691]. PALLETTA [1820]. Anomalous tumor. MONRO Ius [1781]. "Atrox rarissimusque morbus." BOERHAAVE [1783]. Pulpy testicle. BAILLIE [1796]. Struma fungosa (testis). CALLISEN [1800]. AUCT. ITAL. VAR. Spongoid inflammation and tumor. BURNS [1800]. Fungus Hæmatodes. HEY [1803]. WARDROP [1809]. Medullary Sarcoma. ABERNETHY [1804]. Encephaloid, or cerebriform degeneration, or Cancer. LAENNEC [1805]. Milt-like tumor. MONRO IIIus [1811]. Carcinoma spongiosum. YOUNG [1813]. Soft and spongy Carcinoma. ROUX [1814]. Carcinus spongiosus. M. GOOD [1817], (afterwards classed by him with the genus Ulcus). Fungoid disease. A. COOPER [1818]. HODGKIN [1836]. Medullary fungus. MAUNOIR [1820]. Acute fungous tumor. C. BELL [1822]. Galactomyces. RITGEN [1828]. Medullary Cancer. TRAVERS [1832]. Cephaloma. HOOPER [1828]. CARSWELL [1834]. Carcinoma medullare. MUELLER [1838]. Soft Cancer. AUCT. VAR.
					SCIRRHUS, or hard Cancer.	*a*. Pancreatoid Cancer ? ? *b*. Chondroid „ *c*. Lardaceous „ ? ? *d*. Napiform „ *e*. Apinoid „ *f*. Hæmatoid „	Carcinomatous Sarcoma. ABERNETHY [1804]. Carcinoma scirrhosum. YOUNG [1813]. Carcinus vulgaris. GOOD [1817]. Scirrhous Cancer. TRAVERS [1832]. Scirrhoma. HOOPER [1828]. CARSWELL [1834]. Carcinoma simplex et reticulare. MUELLER [1838]. Stone Cancer. AUCT. VAR.
					COLLOID, or jelly-like Cancer.	? ?	Colloid matter, or tissue. LAENNEC [1805]. Scirrhus Ventriculi. OTTO [1816]. Areolar gelatiniform Cancer. CRUVEILHIER [1829]. Gum Cancer. HODGKIN [1836]. Carcinoma alveolare. MUELLER [1838].

The following work is divided into two Parts. The first of these is devoted to the subject of Cancer in general; the second to the description of the disease, as it occurs in all those tissues and organs of the body in which experience has established the fact of its existence.

PART I.

OF CANCER IN GENERAL.

The general history of Cancer, as of all Products holding a high position in the scale of Adventitious Organisations, must be based upon the consideration of its Anatomy, Chemistry, Physiology, Local Morbid Changes, General Pathology, Nature, and Pathological Affinities, and likewise of the Hygienic and Therapeutical measures, whereby the evil influences it habitually exercises on the organism may be averted, removed, mitigated, or controlled. After having examined in as many separate Chapters these various subjects, I shall terminate this division of the volume by such a Definition of the disease as the facts previously established shall appear to justify.

CHAPTER I.

ANATOMY OF CANCER.

The anatomical and physical characters of the three species of Cancer differ so materially as to render a separate examination of each necessary. I shall in the present place limit myself to a statement of the appearances exhibited by cancerous growths in their perfectly evolved state, while evidences of decay have as yet not exhibited themselves, and while their component structure continues free from any contingent or accidental morbid change.* Such characters only, as are ascertainable with the unassisted senses, will be considered in this Chapter.

SECTION I.

ENCEPHALOID.

The name of Encephaloid (from ἐγκέφαλος, the brain, and εἶδος, form,) was first applied by Laennec to a modification of cancerous growth, of which one of the most striking characters consists in its resemblance to the substance of the brain. This resemblance has been noticed by almost all authors who have written on the subject; but Abernethy was the first, by his adoption of the term *medullary* sarcoma, to make it the basis of nomenclature. The word sarcoma is for many reasons objectionable ; while encephaloid is convenient, from its acting, as occasion requires, either as an adjective or substantive.

§ I. The section of an encephaloid mass, when fully developed, presents the appearance of an almost homogeneous matter, of an opaque milky colour, ordinarily dotted with spots of pinkish hue, varying in different specimens in number, size, and shape. In consistence it closely resembles the healthy brain of an adult, and may be broken up between the fingers with about the same facility as the substance of that organ ; if torn through, the lacerated surface presents a coarsely granular aspect. It has no particular smell ;

* For the appearances produced by decay, and by contingent morbid changes, see Part I. Chapter III. Section III. and Chapter IV.

Maunoir alleges that it has the same odour as the brain, but his senses were probably under the influence of the curious theory he maintained respecting its nature.

Encephaloid tumors, like all other Growths, exhibit to the naked eye two kinds of component material,—a stromal or containing, and an intra-stromal or contained, element. The stromal substance, generally of denser structure than the other, divides the mass into minute loculi, lobules, and lobes. Its different divisions do not intersect, but describe curves in such manner as to circumscribe spaces, which, however various in size, have a general tendency to spherical form. Occasionally of fibrous consistence, even in their minuter divisions, the laminæ composing the walls of the loculi (in other words, the stromal structure,) are generally of very delicate cellular texture, and have in some cases been compared by observers to a spider's web. The cerebriform appearance of the entire mass depends upon the contained, rather than the stromal, element.

But this description will very rarely apply to the entire mass of an encephaloid tumor; some portions are commonly harder, others much softer than that just described; and this diversity of consistence commonly coincides with differences in the modes of arrangement of the cancerous structure. The hardest part presents a radiated or finely granular appearance; that of less consistence is largely granular or lobulated; while the softest is collected into large lobes of almost diffluent pulp. The abundance of pink spots, and the opacity of the morbid mass, generally increase with its softness. The facility with which the contained matter is removable from the containing loculi also depends on the consistence of the part examined; when this possesses the density of infant brain, it may be removed by gentle pressure, or by letting a stream of water fall upon it, with as much ease as if enclosed in the cells of a sponge. The expressed substance sometimes preserves the shape of the loculi, and, oozing out like the matter of sebaceous follicles, looks like fragments of boiled rice or vermicelli; a filamentous shreddy locular tissue (the containing basis of the growth) is left behind. When sufficiently firm and adherent to resist this mode of separation, the contained matter may generally be removed by forcible pressure with the hand; structure exhibiting obviously the properties of encephaloid rarely requires more energetic means for the removal of the contents of its loculi.

The pink tint of encephaloid (whether limited to particular spots, or, as is less common, pervading the mass generally) is evi-

dently produced by the presence of numerous blood-vessels; its abundant provision in this respect leads to the striking differences between the vital phenomena observable in it and in the other species of cancerous production. These vessels, which vary in diameter from that of a hair to a line and upwards, and appear to the naked eye to contain florid arterial blood, occur in the form of small isolated striæ in some situations; in others, of arborescent patches. The *vascular* character is in some instances distinctly defined; in others, ill-marked: in the latter case the blood almost seems as if it had simply been laid on with a brush in minute points and striæ. Small rounded or irregular patches of effused blood are visible elsewhere.

This vascular supply is not limited to the containing or stromal element of the structure; the vessels may be traced from the cellular membrane surrounding the growth generally, or from the peduncle of a tumor (when its attachment to the surrounding tissues is of this kind), seen to ramify in the stromal substance, and from this to plunge into the contained matter. The latter frequently appears, on a section of the tumor, to be the part most abundantly furnished with vessels: in some very successfully injected specimens which I have seen, the mass appeared to be almost exclusively formed of a vascular plexus.

§ II. In respect of the manner of its connexion with the natural textures, or, as it is commonly termed, its form of deposition, encephaloid presents itself as a distinct tumor, or is infiltrated amid the elementary molecules of the tissues.

Encephaloid tumors have been spoken of as encysted and non-encysted. The investing cyst, when such exists, is described by Laennec as a smooth membrane, about half a line thick, of a silvery white colour, imperfectly transparent, and easily separable from the enclosed mass. M. Cruveilhier refers to an alleged case of encysted cancer of the liver: here a number of tumors, fluctuating precisely like abscesses, filled with encephaloid detritus of puriform consistence, and bounded externally by fibrous cysts, were scattered through the substance of the organ; their cavity was traversed by vessels of various sizes, supported by fibrous tissue. But I must confess my doubts as to the existence of a true encysted investment in cases of encephaloid growth; I certainly have never seen a convincing specimen of such a condition, and the actually encephaloid character of the material referred to by M. Cruveilhier cannot be considered indubitable. On the other hand, a sort of pseudo-cyst, varying in density with the situation of the tumor, is

occasionally formed by condensation of the adjacent cellular membrane; its inner surface may have a serous aspect. The cancerous growth may under these circumstances be enucleated with comparative facility, as in certain instances referred to by Dupuytren.

Non-encysted encephaloid tumors generally incline to the spheroidal shape, but may be flat, oval, or perfectly irregular in outline. Their surface is finely mammillated, botryoidal, or irregularly lobulated; in some instances convoluted, like the exterior of the brain. In those rare instances, where a capsule of secondary formation exists, the periphery of the tumor is perfectly smooth.

Tuberiform encephaloid occurs in the viscera in a peculiar nodular form, numerous tumors commonly coexisting in the same organ. The liver is particularly prone to this form of the disease, and may contain several hundred rounded nodular masses, varying in size from a pea to a small egg. When seated at the surface of the organ, they occasionally present a remarkable cupular depression in their centre; this peculiarity has been attributed to the peritonæum adhering to the surface of the growth when small, and obstructing its central development. I have more than once seen a similar appearance in superficial encephaloid nodules of the lung; but it is less common in connexion with this organ than would probably be the case were the explanation just stated perfectly well-founded.

The infiltrated form of deposition, of less usual occurrence than the tuberous, and very rare in several organs, as, for example, the testicle, is common, as an incipient state, in the liver; and is observed in all instances where the disease extends by continuity from one tissue to another.

The colour of the exterior of cerebriform tumors varies with their state of vascularisation; whitish yellow is perhaps the most usual tint, but it is not uncommon to find it either reddish, pink, or generally or partially bluish; all four colours may coexist in different quarters of the same surface.

§ III. Encephaloid cancers acquire a larger size than almost any other morbid formation; indeed, with the exception of compound cystoid and enchondromatous masses, no growths, properly so called, ever compete with them in this respect. Tumors as large as the head of an adult are by no means uncommon: Abernethy mentions a case where a mass of these dimensions exhibited itself in each groin. Professor P. H. Bérard observed an encephaloid tumor in the thigh of a female as large as the body of a full-grown man. Veins larger than the index-finger ramified in the exceed-

ingly attenuated integuments investing it. On the other hand, the opposite extreme of smallness is occasionally seen, and may be always detected (if the examination be made under favourable circumstances) when tumors are in the nascent state.

§ IV. *Anatomical Varieties.*—The aspect of growths, possessing the fundamental characters of encephaloid, is not always precisely that hitherto described; hence the necessity for admitting a certain number of varieties.

(*a.*) There are certain firm encephaloid masses which exhibit on section the appearance of the boiled udder of the cow. The terms *mammary* or *mastoid* (the latter is preferable, as the former might be supposed to refer to the seat of the cancer,) may be used in speaking of this variety, as originally proposed by Abernethy. Dr. Carswell conceives that the particular appearance in question arises from the cancerous matter being uniformly disseminated through the texture of an organ. Without meaning altogether to contest the accuracy of this notion, I cannot help observing that such uniform dissemination will not by any means necessarily produce the *mastoid* aspect: the substance of muscle may, for instance, become so uniformly and intimately infiltrated with cancerous matter that the muscle shall actually appear to be composed of that matter, and yet the brain-like character be clearly marked.

(*b.*) M. Recamier has conferred the name of *solanoid* upon hard cancerous masses, of almost homogeneous appearance, of pale yellowish colour, unctuous crisp look, and possessing on the whole much the visible characters of a sliced raw potato. I consider it advisable to retain this term, as it signifies with graphic precision the aspect on section of certain tumors, which furnish milky fluid in abundance under pressure, and eventually become cerebriform; they are of not uncommon occurrence in the liver, and I have seen the variety in the ovary and elsewhere.

(*c.*) In certain tumors, referable to the encephaloid species by all their physiological and pathological properties, the appearance is rather suggestive of the milt of certain fishes than of the brain. Dr. Monro Tertius, the first to insist upon this resemblance in his description of the "*milt-like* tumor," recognised certain analogies in masses having this character to the more common encephaloid; but erroneously believed the growth peculiar to mucous membranes, and otherwise so distinct in its attributes from the latter disease, as to belong to a different order of formation altogether.

The milt-like aspect, especially when well-marked, is rare; I have met with few tumors satisfactorily exhibiting it. When discover-

able, the peculiarity of appearance has seemed to me a result of deficiency of vessels and blood in a structure of extreme closeness; the loculi enclosed by the stromal texture being at the same time extremely small, and their walls so delicate as to be scarcely visible.

(*d. e.*) In a post-peritonæal cancerous tumor, removed after death, I discovered the following characters. The mass was lobulated, the divisions being both on a large and small scale, somewhat elastic, yielding easily with a sharp fracture to pressure with the thumb, of a light greenish-yellow colour, equally marked everywhere except in some spots visibly vascular, and, when even gently pressed, furnishing in abundance a thick, dirty cream-coloured fluid. The surface of a section of this growth at once suggested the idea of the kidney; the resemblance obviously arising from a fibrous arrangement (even tufted in some places) of the structure, coupled with a semi-transparent watery glossiness: here were the peculiarities of the *nephroid* cancer of M. Recamier. Examined under the microscope, I found the mass composed of granules, cells, and peculiar fibres, exhibiting the characters assigned by Müller to the constituents of *fasciculate* carcinoma. The surmise I formerly threw out as to the close alliance of the nephroid and fasciculate varieties was thus more than justified.

I am inclined to regard *fasciculate* cancer as a distinct and important variety of encephaloid, but cannot, with Müller, consider it entitled to the rank of a species apart, for (as I have mentioned, and shall more fully show hereafter,) cells are sometimes to be discovered; and moreover filamentous or fibrillar structure, though to a much less amount, forms a constituent of other varieties of cancer. The coexistence of softness and linear or fibrillar arrangement constitutes its most readily ascertainable peculiarity.

(*f.*) The epithet *hæmatoid* may be conferred on a variety of encephaloid in which the brain-like character is combined with an unusual amount of vascularity,—the vessels sometimes (as in a large tumor recently taken from a patient in University College Hospital) interlacing so as to form a dense and somewhat spongy rete, deficient, however, in the characteristic structure of erectile tissue.

(*g.*) When interstitial hæmorrhage leads to sanguineous infiltration of an encephaloid mass or to irregular accumulations of blood through its substance, and when, especially after ulceration of the integuments, a rapid development of fungating growths takes place from its exposed surface, the diseased formation may be termed *fungus hæmatodes*. The circumstances under which this name is applicable are, however, merely fortuitous, and do not imply any fun-

damental distinction in the nature of the growth exhibiting them. If (inasmuch as the changes to which it refers materially affect the local and general pathological influence of the morbid formation) this name be retained for practical purposes, it should be strictly limited to the disease when in the state described. As a general title for the species, (in which sense it was originally introduced by Hey,) the term is strongly objectionable; and indeed, strictly speaking, fungus hæmatodes can scarcely be considered a variety,—its peculiarities signifying simply a state of accidental complication occurring in a particular species.

Such are the varieties which appear to me possessed of sufficiently marked characters to render their admission practically serviceable. It is obvious that, as in all cases where nomenclature is based upon rude similarity of morbid products to certain well-known natural objects, some latitude must be allowed, in respect of amount of resemblance, in applying the various terms to particular specimens. I may also remark, that the aspect of some of the varieties shows that a more accurate term than encephaloid might be devised for the species; and the absurdity of speaking of, for example, the nephroid variety of encephaloid, obviated. There seem to me to be not a few motives for returning to the use of the old term *soft cancer* for the species.

SECTION II.

SCIRRHUS.

Galen used the word scirrhus (*σκίῤῥος*, from *σκίρος*, *a piece of marble*,) as a synonym of *σκλήρωμα*, *hardness*; and it appears to have been applied by him and his successors to all tumors possessing this character. At an early period, however, it was limited to diseased induration, of which the essential peculiarity is to terminate in intractable ulceration. The term is now employed to designate that species of cancerous growth which is distinguished by its hardness and toughness. I use the adjective scirrhous in the same sense; its indiscriminate application to every structure possessed of the single property of hardness has been, and in certain quarters still continues to prove, productive of serious confusion.

§ I. Though the section of a scirrhous tumor, when perfectly solid throughout, exhibits a stromal and a contained element on close examination, yet in many cases, where the general attributes of this structure are strongly marked, its divided surface, if inspected without any particular care, appears almost homogeneous. The stroma

cannot in many cases be distinguished from the material it contains within its meshes, unless by allowing the light to fall on the surface at different angles, and in some rare instances by submitting a slice of the structure to maceration. Writers who speak (as it has been the common habit to speak) of white bands intersecting tuberiform scirrhus, have mistaken an accidental condition, observable particularly in certain organs (as the mamma) and produced by thickening and cancerous infiltration of some element of the affected organ, for an essential and necessary character.

The proper stroma of scirrhus has a special tendency to irregularly rectilinear arrangement, whence the loculi incline to the rectangular shape. The stroma is closely set; the loculi are consequently small. Descriptions exist in numbers assigning large dimensions and spheroidal outline to the loculi of scirrhus; I have never seen a specimen of the kind, and have no hesitation in affirming that such descriptions refer in reality to fibrous tumors.

The proportion of stromal and intra-stromal matter varies in different specimens of scirrhus; and this variation appears connected with the period of development of the tumor examined. In a very early stage of its progress the stromal structure predominates, forming a firm, solid, pale, fibrous, or cartilaginiform-looking mass; at this period the deficiency of intra-stromal substance renders the stroma itself imperceptible unless upon close scrutiny. The similarity of scirrhus to fibro-cartilaginous texture under these circumstances has been recognised by numerous observers; M. Cruveilhier has even gone so far as to affirm that the only distinctive character (he speaks of those ascertainable with the unassisted eye) between some tumors in the bones, really scirrhous, and others merely fibrous, consists in the presence of cancerous juice (removable by pressure) in the former. The diagnostic importance of this fluid is unquestionable; but I believe that the two kinds of growth may also be distinguished by the rectilinear arrangement of the stroma of scirrhus, and the curvilinear of that of fibrous tumors.

At a more advanced period a softer matter accumulates in the meshes of the stroma, and the locular character grows more obvious.

The section of a scirrhous tumor presents a peculiar semi-transparent glossiness, especially when a thin slice of the substance is examined apart. This glossiness is sometimes so remarkable, that, when the light falls at a particular angle, no distinction of substances can be detected on the surface.

The colour of the exposed surface is bluish-white, when the mass is in its firmest condition; a lilac-yellow, pale dirty fawn, or greyish

tint commonly prevails, when intra-stromal matter has accumulated to any amount.

One of the chief characteristics of this species of carcinoma is its extreme hardness; in this respect it often exceeds cartilage, and there is hardly any exaggeration in the vulgar term "stone cancer." It is, however, to be observed, that this phrase is rather applicable to tumors while still *in situ* (in the breast for instance) than after removal. I have frequently satisfied myself that growths, as hard as marble almost, while yet attached, may feel flaccid and yielding after extirpation; the absence of blood and of vital turgescence explains the change: the earliest alteration produced in these tumors by well-directed compression is, as might be anticipated, of the same kind. Combined with hardness is a remarkable degree of toughness. Among the natural tissues the intervertebral fibro-cartilages, as a general rule, most nearly resemble scirrhus in respect of consistence. Like all structures possessed of these characters of density and toughness, scirrhus emits a creaking noise, when divided with a cutting instrument.

By pressure, varying in amount with the hardness of the growth, a fluid may be forced to exude from the substance of schirrus. In very solid masses this fluid is thin and watery; in those which are less firm, it is thicker, more opaque, inclining to creamy appearance, and may be tinged with blood.

While the entire mass of the tumor continues firm, the adhesion of the intra-stromal and stromal matters to each other is close and intimate; maceration may even be required for their separation.

The interior of a scirrhous tumor feels somewhat clammy and unctuous. The amount of induration existing in its component structure, at any given period of its development previous to the occurrence of morbid softening, or of various contingent changes, is remarkably equable throughout its entire substance. It is no doubt stated by numerous authors, that there are frequently observed, scattered through the interior of scirrhous growths, one or more small masses of homogeneous pulpy matter, of yellowish-brown colour, semi-transparent, slightly glutinous, and altogether closely resembling apple-juice;—the transition from hardness to complete pulpiness being sudden, the stratum immediately adjoining the soft matter, in fact, possessing the full share of density existing elsewhere. Authors who describe these appearances (their description, in the first place, pourtrays very imperfectly the real state of things,) are at a loss to determine their nature, but generally regard them as the result of softening of previously hard

scirrhous substance. The fact, as observed by themselves, that the transition from perfect induration to complete pulpiness is sudden, might have warned them against this erroneous view. I shall have occasion to show that scirrhus in reality softens into a buff-coloured or white pulpy opaque material;* and that the appearance above referred to depends upon the development *de novo* of colloid structure in a scirrhous basis,—a phenomenon perfectly independent of decay, and simply indicative of a change in the mode of evolution of the blastemal fluid furnished by the vessels of the mass.

Certain scirrhous tumors exhibit on section a variable number of dull-white opaque filaments of different lengths, irregularly scattered through their substance. These filaments, described as essential elements of schirrus, are in truth nothing more than thickened lymphatic vessels or, in the mamma, lactiferous tubes. Beside them may repeatedly be seen similar structures cut across, and exhibiting an obvious bore; and I have succeeded in detecting the hollow character in some seen lengthwise. Such filaments are said by Müller not to occur except in glandular parts; I have never myself seen them except in cancer of the mamma. They are very distinctly shown in Plate I. fig. 9.

Scirrhus is not strikingly vascular; it is often impossible to discover any blood-vessels with the naked eye in an uninjected specimen. That it possesses any share of vascularity has indeed been alternately denied and affirmed. Delpech is stated, as something extraordinary, to have shown some capillaries running a few lines into a tumor. Scarpa even declares, that, no matter how fine material be employed for injection, none can be forced into the morbid growth itself—that the principal arterial trunks of the diseased organ only are filled. Mr. Travers and Lobstein write in a similar strain. Dr. Carswell states that blood-vessels are rarely perceptible; and that such as are discoverable really belong to the natural tissues enclosed within the adventitious substance. Cruveilhier on the other hand maintains, that, in spite of their tenuity, vessels may be recognised with a little attention; while Müller expresses his astonishment that authors should have represented this structure to be without them, and asserts he has never failed to discover them on accurate examination. The question is one not very difficult of decision: these tumors are undoubtedly vascularised, injected specimens abound demonstrating the fact; but they are irregularly and unequally supplied with vessels. Patches of some size, which exhibit no trace of blood-vessel, may be seen

* See Part I. Chapter III. Section III.

in the vicinity of others sufficiently vascular; but the physiological inference deducible from this fact is not of the importance it would have possessed previously to the discovery of the mode of nutrition of extra-vascular structures.

With the exception of the statement just made respecting the occurrence of lymphatic vessels in certain scirrhi, nothing can be affirmed from actual observation concerning the relations of the lymphatic and nervous systems to this species of cancer; there is, however, every motive for supposing them identical with those I have admitted in the instance of encephaloid.

§ II. Scirrhus is either developed in the form of a tumor, or is infiltrated in the substance of organs. Scirrhous tumors are usually rounded or oval, and, when subcutaneous, flattened; their external surface smooth in the outset, irregular and anfractuous in the more advanced stages. The latter disposition is most strongly marked when the disease has originated in a single point; a sort of lobulation, never however so marked as in the case of encephaloid, is sometimes observed, when the total mass is composed of several minor growths. I have never observed a scirrhous growth invested with a true cyst; the statements of Dupuytren, Recamier, and others respecting its occasional existence, seem to me to require confirmation. The infiltrated form of the disease is not unusually met with in some organs. Of five cases of cancer of the brain described by Andral,* two were of infiltrated scirrhus. In the uterus this mode of deposition of scirrhous substance is much the more common; it occurs in the bones too, in them gradually producing softening, while it indurates the soft parts—a striking illustration of the assimilative power of the morbid growth: in each instance it alters the consistence of the part to its own standard.

§ III. Scirrhous tumors very rarely, if ever, acquire large dimensions; they seldom exceed an orange in size. This character helps to distinguish them from fibrous growths. In cases of infiltration of tissue, the total diseased mass may be of greater bulk than that mentioned; but even under these circumstances the volume of the affected part is commonly limited.

§ IV. *Anatomical Varieties.* — (*a.*) The *pancreatic sarcoma* of Abernethy has acquired some claim to be considered a variety of scirrhus from its having been so regarded by Dr. Carswell. This pathologist believes that the peculiar appearance, suggestive of the tissue of the pancreas, depends upon a lobulated arrangement of the

* Clinique Médicale, t. v.

scirrhous matter. But uniformity of opinion is far from prevailing in respect of the real character of the product Abernethy had in view. M. Maunoir regards the pancreatoid tumor as a structure *sui generis;* to M. Andral* it appears a mere variety of fibrous growth; Dr. Hodgkin has no difficulty in assigning it a place among "non-malignant tumors composed of compound serous cysts;" according to Chelius, the pancreatoid aspect is nothing more than an accidental modification of encephaloid; while Professor P. H. Bérard, after a diligent study of Abernethy's essay, declares himself unable to determine to what description of structure the term was applied. My own conclusion on the subject agrees with that of M. Bérard. Abernethy briefly describes a vascularized tumor seven inches and a half in length, three and a half in circumference, weighing two pounds and a half, and developed under the ocular conjunctiva, as an example of pancreatic formation; now the seat, bulk, and other characters of this mass appear to afford tolerably strong evidence that it was not of truly scirrhous nature. Müller speaks of an encephaloid tumor, of which the innumerable small component lobules gave the mass a pancreatoid appearance; and some of Cruveilhier's figures of pultaceous alveolar carcinoma bear no distant resemblance to the structure of the pancreas. As far as my experience goes, the term is more applicable to either of these species of cancer than to scirrhus; and I can discover no particular advantage in retaining the term.

(*b.*) There seems no objection to applying Recamier's term, *chondroid*, to such dense and crisp scirrhi as in their early stages of growth exhibit on section an unusually shining aspect and bluish-white colour. Still, it appears scarcely correct to look upon this state as characteristic of a variety; it is significant rather of a particular stage of progress.

(*c.*) In perusing the works of French pathologists (as also of English writers who have adopted the term) much difficulty is felt in determining to what growths they apply the phrase *lardaceous tissue;* or rather the conviction arises that they thus designate all morbid productions of every class, either themselves possessing, or producing in the structures they occupy, an accidental resemblance to the boiled rind of bacon. Now scirrhus, when infiltrated in the substance of organs, frequently assumes this appearance. In this manner Andral speaks of the texture of the brain being "transformed into a lardaceous tissue possessing all the characters of scirrhus." Although its adoption be not absolutely called for, still,

* Anat. Pathologique, t. i. p. 270.

as the term certainly gives a very accurate notion of the appearance it is intended to designate, the only motive for rejecting it seems to be the already overloaded state of the nomenclature of cancer.

(*d.*) In certain scirrhi belonging to that rarer class in which an appearance of bands is clearly visible to the eye on a divided surface, the arrangement of these bands is such as to produce some similarity to a cut turnip. The term *napiform* (Recamier) may be used to distinguish the peculiar character of such tumors.

(*e.*) The section of a scirrhous tumor sometimes exhibits a most striking resemblance to the cut surface of an unripe pear,—the variety may be conveniently termed *apinoid* (from ἄπιον, *a pear*, and εἶδος, *form*). The similitude arises from the dissemination of comparatively opaque, almost buff-coloured spots through a more translucent ground of very pale yellowish lilac tint. The quantity of more opaque substance gradually increases, and eventually predominates, so as to alter the appearance of the surface completely.

The characters of this condition of scirrhus in its advanced stage were well shown in a tumor which I recently examined immediately after excision. Two substances were clearly visible on the divided surface: one of these (A.) was semi-transparent and light-coloured; the other (B.) opaque, and of dull yellow hue, approaching to buff. The latter material lay studded over the surface in different forms, accumulated in some spots in irregularly rounded patches the size of a small pin's head, in others arranged in arborescent figures, in others forming a sort of reticulum of extreme delicacy, the meshes being scarcely large enough to receive a pin's head. When the mass was narrowly examined, and especially when dragged so as to be rendered tense, a third substance (C.) became apparent. This consisted of narrow bands, somewhat transparent (but of a duller white colour than matter A.), few in number, irregular in direction, and apparently composed of the natural cellular tissue of the gland infiltrated with scirrhus. The stromal character was remarkably deficient.

On the exposed surface two or three holes, of the size of a very small pea, lined with a smooth membrane, were perceptible.

When the mass was gently pressed, there exuded: 1. in some spots a thin, turbid, brownish, watery fluid in small quantities; 2. in other places a thick, whitish, opaque, creamy liquid; 3. elsewhere an opaque material of pultaceous or cheesy consistence, of pale yellow or dull white colour, protruded exactly like the matter of sebaceous follicles, leaving minute cavities, such as those already

described, in the sites it had filled. When newly exposed by the expression of their contained matter, these cavities exhibited a perfectly white surface; two days later, they had acquired a red tint. In the same way, when first removed, the mass exhibited no vascularity to the naked eye; two days afterwards, blood-points were very distinctly seen, especially in the substance c.

The mass exhibiting this structure was firm and hard, but rather crisp than tough, being easily broken up or torn; the general colour fawn-grey; the aspect glossy.

I have been particular in the description of this tumor, because it furnishes an excellent illustration of, as it has appeared to me, the most common condition of scirrhus of the mamma, as discovered either after excision or death; and because it furnishes an obvious specimen of the structure to which Müller has drawn particular attention, and accorded particular importance, as a distinct species of cancer, under the name of *carcinoma reticulare.*

Tumors of this character are sometimes harder, sometimes softer, than the specimen just described. I have not seen them except in the breast; Müller, however, affirms he has observed this structure in various other situations; whence it would follow that the texture of the mamma has no influence in producing its peculiarities.

(*f.*) Although of comparatively rare occurrence in truly scirrhous structure, the *hæmatoid* condition does sometimes exhibit itself in this species of cancer. The peculiarities then visible are of the same kind as those of the hæmatoid variety of encephaloid: they differ only in being less fully developed.

SECTION III.

COLLOID.

The term Colloid, derived from κολλώδης (κόλλη, *glue*, and εἶδος, *form*), was applied by Laennec to adventitious products, having a jelly-like appearance. In his nomenclature the word appears to have assumed the signification of the gummata of ancient authors.

A strikingly marked species of cancer exhibits this gelatiniform aspect in the material filling its component loculi; to this kind of formation it seems advisable to restrict the application of the term in question.

A tolerably accurate description of colloid cancer was given in 1816 by A. W. Otto; * and an illustrative engraving conveys,

* Seltene Beobachtungen, S. 119. Taf. i. Fig. 4. 1816.

though in a rough manner, its characteristic features: the disease, which occurred in the stomach, was described as "scirrhus" of that organ.

§ I. The section of a colloid growth presents an appearance which, once seen, can scarcely be forgotten. The surface is divided into a vast number of distinct loculi, regularly arranged, of an oval or rounded shape, varying in size from that of a grain of sand to the largest pea. The septa composing the walls of these loculi possess distinctly fibrous characters; their thickness is pretty uniform throughout; occasionally, however, they are broader in some situations than in others; in this case, the thicker septa may generally be found to give off productions forming the walls of secondary loculi, and these again others, constituting a tertiary order. The loculi sometimes form shut sacs, in other instances communicate with the circumjacent cells; it is not very unusual to observe some of these loculi, in which the walls seem to have collapsed and almost coalesced from the removal of the contained matter. In point of consistence a colloid mass, of which the loculi are perfect, usually resembles firm cheese, but may be much harder. The general colour of the divided surface is greenish-yellow,—the tint being mainly dependent on that of the contained matter, which is, besides, semi-transparent, tenacious, and clammy, and resembles in respect of density, as in other physical properties, soft jelly. It is not easily expressible from the containing loculi, but may be picked out with the point of a scalpel, or removed by maceration.

A remarkable character of this structure, so long as the process of destruction has not set in, is, that wherever or in whatever form it is developed, the appearance and properties of the gelatiniform substance are exceedingly uniform in every part of its extent; the firmness, transparency, and other qualities of the material are as distinctly marked towards the centre as the periphery of the mass. The loculi, too, are prone in their primary, secondary, and subsequent series to exhibit great uniformity in point of size.

Little has yet been done in investigating the vascular condition of colloid. Cruveilhier says that both arteries and lymphatics in a permeable and healthy state are found between the alveoli of the diseased mass. When the disease has reached its maximum development, no trace of vessels is, according to the same observer, discoverable. Müller speaks of a case in which the loculi were invested with a distinct vascular membrane, but is silent respecting the character and mode of distribution of the vessels. Andral is not aware that vascular twigs have ever been traced into the jelly-

like matter itself. For my own part, I have not as yet seen vessels either in the walls or contents of the loculi; but I have not made any attempts at injection of the structure.

§ II. Colloid presents itself as a distinct solitary tumor; or the morbid structure infiltrates the tissues it infests.

When occurring in the form of a tumor, it is said to be sometimes surrounded with a pseudo-capsule consisting of condensed cellular tissue, in some cases of such tenuity that the character of the subjacent substance may be partly distinguished through it. The external surface is lobulated. Such an appearance as this I have not myself seen, except in connexion with omental colloid. The infiltrated form is of most common occurrence in the stomach, and is likewise met with in the intestines and omentum. The former viscus retains its natural shape when thus affected, though its cavity is much diminished in size from the occasionally extreme thickening of its walls: when the latter condition is carried to its greatest extent, the organ does not collapse when removed from the abdomen. Disseminated nodules of colloid cancer do not, so far as I believe, ever occur in the parenchymatous organs. But small spots of infiltration in the omenta sometimes exhibit this appearance: they vary in size from mere granulations to tumors of moderate size; two or more occasionally coalesce into a single mass.

I cannot better describe the characters of infiltrated colloid, than by stating the appearances I some time since observed in a stomach affected with this form of the disease. The morbid matter occupied about one-third of the posterior surface of the organ, terminating at about half an inch from the pylorus, and formed an irregular globular elevation somewhat more than half an inch high (exclusive of the coats of the stomach), two broad, and two and a half wide. Over by far the greater part of its surface, which was irregularly mammillated, and of a greenish-yellow tint, the morbid matter was uncovered, and exhibited its characteristic locular and jelly-like aspect. But on the confines these characters were only seen in some spots, where destruction of the investing mucous membrane had taken place: this destruction seemed to consist in a simple wearing out from gradual attenuation; there was no hardening or elevation of the borders of the small perforations thus produced, nor had these the appearance of ordinary ulcers. Close beside this mass, along its cardiac border, was an elevated flabby formation, more than half an inch high, and three lines thick in some places, and feeling exactly like a piece of lung in a state of simple *condensation* from pressure. On making a section of this

production, the colloid tumor and the coats of the stomach, the following were found to be their condition and mode of relation. The peritonæum was everywhere traceable, and in some parts considerably thickened; the muscular tunic, of a pale yellow-green tint, varied from one-eighth to a quarter of an inch in thickness: the major part of the colloid mass lay on the gastric surface of the cellulo-fibrous membrane, to which it adhered closely; in one or two points of its periphery the diseased structure penetrated, as it were, through this membrane and the muscular coat down to the peritonæum, along the inner surface of which it then spread for about half an inch. Where the mucous membrane existed entire over the colloid structure, it could be dissected from off the latter without injuring the cancerous loculi—a fact showing that the morbid matter was here developed between the cellulo-fibrous and the mucous tunics. But the colloid loculi also extended, gradually decreasing in closeness and number, into the elevated production already referred to: this seemed itself to be nothing more than a fold of the mucous coat in a state of hypertrophy, accompanied with flabby induration; it had neither the structure nor the consistence of any form of indurated carcinoma, and its gastric surface was perfectly free from abrasion and apparently healthy. Hence it appears that the mucous membrane, previously rendered hypertrophous, may, as well as the cellulo-fibrous and mucous tunics, become the nidus of the diseased formation. M. Cruveilhier has made a closely similar observation, for he remarks that the fungous vegetations, observed in the substance, or on the confines of gastric colloid, are mucous papillæ prodigiously enlarged. According to Müller, the development of the gelatinous cells is coeval between the fasciculi of muscular fibres and in the mucous tunic: in the earliest stage of the disease the cells are only visible with the aid of the microscope,—as might be imagined *à priori*.

§ III. Colloid growths acquire considerable bulk; there is a formation of this species as large as a cocoa-nut, and connected with the omentum, among the preparations in the collection at King's College; and the Museum of University College contains one of still larger dimensions. In the infiltrated state it sometimes extends over upwards of two-thirds of the anterior and posterior surfaces of the stomach, as in Otto's case; and Cruveilhier is correct in stating that in a good proportion of instances of destruction of the entire surface of that viscus, the disease exhibits the present form of structure.

§ IV. *Anatomical varieties.*—One of the distinguishing attributes

of this species of cancer is its apparent insusceptibility of assuming such variation of internal arrangement, as to call, in this point of view, for the establishment of varieties. But, it is said, the properties of the contained matter are not always the same: instead of being simply jelly-like, this may be perfectly transparent and almost white, constituting the alveolar cancer *à matière perlée* of M. Cruveilhier.* This substance is represented to be tenacious, yet without adhesion to the containing cells and easily enucleated; the contents of each cell resembling "a small pearl of the finest water." I believe that Müller is perfectly right in regarding this pearl-like substance as a granular deposit of the peculiar variety of cholesteric fat, to which he has given the name of cholesteatoma. Such deposition, occurring as it does in connexion with various morbid states, does not give the attributes of a variety to the cancerous formation in which it may be seated.

Again, M. Cruveilhier states that the contained material may be opaque, of yellowish hue and tallow-like aspect, with granular fracture and feel, and the chemical constitution of casein. Under these conditions the growth has been met with in the bones, uterus, vagina, and walls of the urethra, and constitutes the *areolar pultaceous cancer* of that pathologist. The Museum of University College contains a specimen of a growth from bone exhibiting distinctly the characters in question; but it is in my mind doubtful whether the disease therein is not more closely allied to the encephaloid, than the colloid species.

The development of colloid structure sometimes arises in a basis of scirrhus,—a *scirrho-colloid* formation is the result. In one portion of a remarkable specimen of cancer of the breast, contained in the University College Collection, the combination of the two species is very distinctly seen. While the major part of the growth is composed of colloid structure, the spot referred to, of scirrhous characters, contains, scattered through it, numerous minute loculi, varying in size from that of a millet-seed to that of a pin's point, exhibiting the usual properties of colloid carcinoma. From the appearances traceable in this preparation, no doubt can be entertained that the particles of colloid structure were evolved within a pre-existing nidus of scirrhus.

* Anat. Pathologique, Livrais. v. art. Sarcocèle.

CHAPTER II.

CHEMISTRY OF CANCER.

The chemical investigation of cancerous disease is yet in its infancy. Nevertheless some few facts have been ascertained with sufficient certainty to entitle them to general admission. A complete view of the subject should embrace not only the chemical constitution of cancerous growths themselves, but of the material wherefrom they germinate, of the fluid that pervades them, and of the discharge they furnish. Besides, the chemical condition of the blood, the chyle, the lymph, and the urine of persons affected with the disease (suggestive as reference to such questions must at least prove of important points of inquiry) will be made the subject of brief consideration in another part of the volume.*

(*a.*) *Cancer-blastema.*—Of the chemical composition of unevolved cancer-blastema direct experiment has not yet spoken. That this fluid is essentially composed of liquor sanguinis will be elsewhere sufficiently established;† and that the liquor sanguinis, thus disposed of, differs in chemical qualities from that constituent of the blood, when in the natural state, can scarcely be questioned. It can scarcely be questioned (although demonstration of the fact be completely deficient), first, on the score of rational inference; and secondly, on the evidence of the strongest analogy: it has, in truth, been shown by Mulder, that the exudation-matter of ordinary inflammation yields gelatin, while none can be extracted from the buffy coat of the blood;—here new chemical attributes have been most rapidly acquired.

(*b.*) *Substance of cancer.*—The inquiries of different observers, especially perhaps of Müller, have assigned cancer its place among protein-formations; it belongs essentially to the albuminous variety, though both fibrin and casein enter (in general to a comparatively slight amount) into its composition.

(1.) *Encephaloid* substance, I have found, does not lose its white colour by forty-eight hours' maceration in lime-water; but its consis-

* See Part I. Chapter V. Section II. § II.

† See Part I. Chapter III. Section I.

tence diminishes, and it becomes excessively fœtid. The fœtor produced by similar maceration in water is less marked, and of a different character. A weak solution of hydrochloric acid or of alcohol increases the hardness and density of the mass, and retards or prevents the development of fœtor.

M. Hecht of Strasburg * made some experiments with the view of establishing the intimate composition of this structure. The chief result of these was, that gelatin entered very abundantly into the constitution of hard specimens,† albumen into that of softened masses, while fat occurred in neither. Morin,‡ Collard de Martigny,§ and Wiggers‖ also agree in enumerating gelatin among the constituents of encephaloid; on the other hand, in the subjoined analysis of this morbid product by M. Foy,¶ the most elaborate yet published, not a particle of that principle is noticed. I place beside the analysis of encephaloid that of scirrhus by the same chemist.

		Encephaloid.	Scirrhus.
Albumen		47·00	42·00
White fatty matter		7·50	5·00
Red do.		5·35	3·25
Osmazome		4·00	0·00
Fibrin		6·50	5 85
Water		8·00	5·00
Oxide of Iron		1·35	1·65
Subphosphate of Lime		6·30	16·60
Carbonates of	Soda	2·75	5·00
	Lime	4·00	6·60
	Magnesia	1·00	0·85
Hydrochlorates of	Potassa	2·70	4·10
	Soda	2·00	3·25
Tartrate of Soda		0·35	0·85

Maunoir had previously ascertained that this substance does not yield gelatin; and Müller, who divides all adventitious growths, in respect of their chemical composition, into three classes, the albuminous, the gelatinous, and the fatty, ranks cancerous formations with

* See Lobstein, Anatomie Pathologique, t. i. p. 426. 1829.

† The progress of chemistry requires this mode of expression to be altered: gelatin (whether of the varieties glutin or chondrin) does not exist as such in animal structures, but is formed through the action of boiling water on them.

‡ Journal de Pharmacie, t. viii. p. 415. 1822.

§ Journal de Chimie Médicale, t. iv. p. 322. 1828.

‖ See Mühry, Ad parasitorum malignorum, imprimis ad fung. medull. oculi, historiam symbolæ. Götting. 1833.

¶ Archives Générales de Médecine, t. xvii. 1828.

the first, and most plausibly ascribes the occasional detection of gelatin by chemists to the association of cellular membrane with the matter analysed. He affirms that, except in one case of encephaloid in the kidney, he never obtained any notable quantity of that principle, even after submitting the morbid substance to twenty-four hours' boiling. Casein he distinctly detected in the same specimen. Wiggers discovered phosphuretted fat in this species of growth; Gugert and Marchand cholesterin, a variety of fat frequently met with in adventitious products.

(2.) Morin, Collard de Martigny, and Hecht have examined the chemical constitution of *scirrhus*, and the two latter chemists published quantitative analyses of some specimens. All three agree in enumerating gelatin among its elementary principles. In three analyses of scirrhus, made by M. L'Héritier,* gelatin was found twice (growths in the breast and back); it was absent in a scirrhous tumor of the uterus. The average proportion of fibrin found by this analyst in these cases was so high as 20·38 per cent., that of albumen 26·55. The analysis by M. Foy (as given above) leads to the inference, when compared with that of encephaloid by the same chemist, that scirrhus is chemically distinguished from the softer species of cancer by containing a less quantity of albumen; by being wholly deficient in "osmazome" (animal extractive), and containing nearly double as great an amount of inorganic saline matters,—the proportion of the latter being 37·25 per cent. in scirrhus, 19·10 per cent. in encephaloid. No gelatin appears among the materials furnished by the analysis of either species of cancer. Müller's observations confirm their accuracy in this latter particular: after repeated examinations of mammary scirrhi, which had been boiled for eighteen or twenty-four hours, he only succeeded once in detecting gelatin. Casein he discovered in the variety which he terms carcinoma reticulare, and considers it a very uniform constituent of carcinoma of the breast; but that its presence in this gland does not depend on the contents of the remaining fragments of the lactiferous ducts he conceives to be shown by its entering into the composition of the morbid product in other organs.

The material composing the "reticulum" of carcinoma reticulare Müller found to be composed of a substance resembling coagulated albumen: if the "reticulum" be, as I believe, nothing more than softened scirrhous matter, that such should be its composition is not to be wondered at.

* Chimie Pathologique, p. 688. 1842.

(3.) The jelly-like matter of *colloid* retains its transparency in preparations preserved in spirits of wine. Müller was unable to discover any trace of gelatin in the expressed jelly, when carefully freed from membranous structure. A tumor, which had been kept in alcohol, was boiled for eighteen hours, and at the end of that time had only yielded a very small quantity of matter, which, though somewhat allied in properties to the salivary principle (ptyalin),* was in truth *sui generis*, and could not be precipitated by any reagent, not even by tannin: its existence was established by evaporation of the fluid in which the mass had been boiled. When tumors, which have been long kept in spirits, are operated on, they are found free from "osmazome;" this extractive matter must be first carefully removed, when fresh specimens are made the subject of analysis. No casein is found in the jelly-like matter. Cruveilhier likewise ascertained that the matter contained in the loculi yields albumen only in the ordinary specimens of the disease; but, in a remarkable instance of the so-called pultaceous variety occurring in the cranial bones,† the contents of the alveoli, submitted to analysis by M. Boutin-Limousineau, were ascertained to consist of casein.

The alkalescence or acidity of the substance of cancer has of late years ceased to attract attention. At a comparatively early period much importance was attached to this point. Alliot, physician to Louis XIV, maintained that the proper cause of every tumor was an acid, varying in nature and abundance,—that of cancer being especially strong and acrid.‡ Similar notions were held by Martinet of Soulaines§ at a later period; and, as will hereafter be seen, these notions led to the adoption of a particular mode of treatment of the disease.

The dissimilar influence of maceration in alcohol on the different species of cancer is well worthy of note. While the transparency of the locular gelatiniform matter of colloid remains unaltered, scirrhous, and especially encephaloid substance, is rendered perfectly opaque.

The ultimate microscopical cells of cancer are insoluble in cold and boiling water, and are not seriously affected by acetic acid,—

* It is now believed by a considerable number of practised chemists that all the animal fluids yield a water-extract, which strongly resembles, if it be not altogether identical with, ptyalin.

† See Part II. Chapter VIII.

‡ J. B. Alliot, Traité du Cancer, 12mo pp. 21, 126. Paris, 1698.

§ Observations Médico-Chimiques sur le Cancer. Paris, 1781.

characters distinguishing them from the red and white corpuscles of the blood, and from pus-corpuscles.*

(*c.*) *Ichor and Discharge.*—Crawford† found the fluid discharged from cancerous sores exhibit alkaline reactions, and even ascertained the presence of free ammonia. He likewise detected sulphuretted hydrogen. Ploucquet,‡ on the other hand, states (on the testimony of different authors) that the virus of cancer sometimes effervesces with acids, sometimes with alkalis.

Morin,§ again, found the ichor of a cancerous tumor of the breast, as well as the semi-liquid pulp in its interior, exhibit alkaline reactions. Free ammonia was discovered by him, as well as hydrosulphate of ammonia.

But in this case, and doubtless in others in which similar reactions were discovered, putrefaction had obviously commenced. Decomposition certainly gives cancerous masses an alkaline reaction ; ‖ but, whether their substance be in the natural state acid or alkaline, may be considered yet open to inquiry.

* See Plate I.

† Phil. Trans. vol. lxxx. p. 391. 1791.

‡ Literat. Med. Digest. t. i. p. 235. 1808.

§ Loc. citat.

‖ Such is not the immediate effect of decomposition on all animal substances. The first circumstance announcing this change in pus (which is naturally neutral or slightly alkaline) is the occurrence of acid reaction, owing to the development of either lactic or acetic acid.

CHAPTER III.

PHYSIOLOGY OF CANCER.

I INCLUDE, and propose to examine, under this head the phenomena attending and influencing the evolution of cancer in the natural order of things,—the circumstances of its *origin, growth, decay, elimination, cicatrisation*, and *local regeneration*. Cancerous structures, precisely like the original tissues of the body, exhibit certain series of phenomena characteristic of, and necessary to, a state of perfect health of their proper substance. These phenomena it is a matter of importance to distinguish from certain contingent states indicative of actions actually morbid in respect of that proper substance.

The different species of cancer (which present such differences anatomically, as to render their separate examination, in that point of view, imperative) so closely resemble each other in respect of their physiological processes, that useless repetitions would be entailed by their separate consideration under this aspect. Unless when the contrary is particularly mentioned, the statements which follow are consequently to be understood to refer to all three species of cancer.

SECTION I.

ORIGIN.

§ I. It is unnecessary to review all the hypotheses brought forward at different times respecting the origin of cancerous substance; the majority of these are either so *primâ facie* absurd, so insignificant, or so repugnant to the results of sound observation, that they are only fitted to figure among the curiosities of medical literature. The reader may well be spared an inquiry into speculations ascribing cancer to the atrabilis or a melancholic humour—to lymph converted into an acrid and destructive fluid—to the presence of a gas possessing properties analogous to those of hydrosulphuric acid—to fluids spontaneously effused and rendered corrosive by putrefaction—to a depravation of the nervous fluid—or to the presence and action of a virus composed of an ammoniacal fluid containing oxide of nitrogen in excess.

§ II. With these vain hypotheses may assuredly be classed that, which, under different forms, seeks to connect the appearance of cancer with the presence and agency of parasitic animals. I should, indeed, scarcely have conceived it necessary to advert more particularly to this theory, than to the others just mentioned, had it not been very recently revived with considerable pretension. It appears to have first attracted attention through the writings of Justamond, an author of the last century, who ascribed the formation of cancer to "insects, or the germina of these, taken up from the air by the lymphatic vessels." * He quotes a thesis by Martin Schumacher, and the work of Quadrio,† to show that he was by no means singular in entertaining this opinion. The latter writer had seen the insect, and describes its length, breadth, and colour.

Recently MM. Bauperthuy and Adet de Roseville‡ having constantly found animalcules in great abundance in cancers, before as well as after the occurrence of softening, have ascribed the development of the disease to these animalcules, precisely as the occurrence of scabies is referred to the presence of the acarus. I shall elsewhere recur to the subject of these conjectures.

Allied to these notions are the theories of Dr. Adams, who supposes carcinoma to be the result of the generation, growth, and multiplication of a particular entozoon (the "hydatis carcinomatosa"), and of Dr. Baron, who likewise regards the diseased formation as of hydatid origin, but denies its "animalcular existence." All such notions fall to the ground before the simple fact, that no one has ever seen the imagined hydatids.

Mr. Carmichael looks upon cancer as "an animal fungus possessed of independent vitality;" and it is not uncommon to find the product spoken of by writers as a "parasitic growth," a "malignant parasite," &c. But it would be unfair to deduce from the employment of the latter terms that all persons who use them actually class carcinoma with true entozoa: they rather appear desirous, in thus designating cancer, of signifying its possession of intrinsic powers of vegetation. The practice of employing the phrase even in this way is reprehensible; while the notion that carcinoma occupies the same place in the nosology as entozoa, if seriously held by any pathologist, stands in need of no confutation.

* Methods pursued in the treatment of Cancerous and Scirrhous disorders, p. 65. 1780.

† Nuovo Methodo per curar ogni Canchero. Venez. 1750.

‡ Comptes Rendus des Séances de l'Acad. des Sciences, t. vi. p. 64. Janv.—Juin, 1838.

§ III. I turn to doctrines more worthy of consideration either on account of their speciousness, their influence on general opinion, or their partial accuracy: after having passed these in review, I shall submit the theory which I believe most consonant with fact and observation.

Pouteau professed that the disease is primarily induced by a mechanical injury of the affected parts. He conceived that this injury, a blow for example, necessarily leads to the extravasation of blood and other vascular fluids; that the effused blood liquefies, acquires acrid properties, irritates the circumjacent nervous filaments, and thus gives origin to a growth, which in process of time becomes dense and voluminous.

Hardly differing from this fundamentally is the notion (derived obviously from certain principles of John Hunter), taught by Abernethy, that deposition of the coagulable part of the blood is the first step in the formation of all adventitious structures. This extravasation might, he conceives, be the effect of an accident, or of a common inflammatory process, or of diseased action of the surrounding vessels, and take place either in the cellular tissue, in the parenchyma, or on the surface of organs. The subsequent development and increase of this matter, when once organised, he believed to depend on its own inherent powers and upon actions maintained in itself. It is now understood that effusion of blood does not necessarily precede the formation of tumors, and hence that Abernethy's theory is untenable as an exclusive one; nor can the vagueness of some parts of this doctrine fail to strike the pathologist of the present day.

§ IV. In 1815 C. Wenzel undertook to establish the identity of scirrhus and simple induration; and believed he had succeeded in ascertaining that cancer was nothing more than a result of inflammation in indurated parts. If Broussais be believed, cancer arises from acute or subacute inflammation, and the progress of the former is always in the ratio of the intensity of the latter; external cancer is the product of an irritative degeneration of the tissues in which fat and albumen abound. Similar notions (conceived obviously under the mere personal influence of the last-named powerful but mistaken teacher) were entertained by Breschet and Ferrus: these writers maintain that cancer invariably succeeds irritation or inflammation, and is incapable of being developed, unless in situations where either of those states has pre-existed. Inflammation, they allege, leads to the effusion of coagulable lymph or of a strongly concrescible albuminous liquid into the cellular

element of the tissues; the effused matter is, according to circumstances, either absorbed or remains as an indurated mass tending to disorganization. Scirrhus they, like Wenzel, consider identical in nature with the indurations or callosities, which occasionally form on the confines of wounds and fistulæ.

The sophistry of the system of argument by which the doctrine of irritation was upheld is notorious: but the facts that simple induration is a state distinguished by its inactivity, while scirrhus possesses in itself an active principle of increase and growth; that carcinoma assimilates to its own nature the tissues it attacks, while inflammatory induration is modified by the particular structure affected; that the substance of cancer may from the first be almost pulpy, instead of necessarily possessing any marked degree of hardness; furnish a better refutation of it than any critical exposure of its fallacies. The former important result of clinical observation is confirmed, while it is explained, by microscopical investigation. On the one hand, simple induration-matter (as Müller was the first to state) does not contain cells provided with the germs of a new generation of similar structures; while, on the other hand, an inherent faculty of growth is produced and maintained in cancer by the formation of cells, which do contain such embryos of secondary generations.

§ V. From the capital error of the doctrine of Broussais pathologists of the eclectic school easily steered clear. M. Andral, the most distinguished of its Continental disciples, reflecting on the impossibility of producing any form of carcinoma by exciting even the most intense degrees of inflammation in the tissues of animals, —and also taking into account the frequent formation of that substance in cases where no local or general symptom of irritation had preceded its appearance, as well as the far from uncommon presence of cancerous masses in the midst of tissues possessing every characteristic of the most perfect health (as, for instance, in the lung and liver), felt no hesitation in rejecting the doctrine of Broussais. He admits (as all will do who have had opportunities of satisfactorily ascertaining the early condition of the diseased part, either by direct observation or through the testimony of intelligent patients), that irritation sometimes precedes and appears to act as the local exciting cause of the growth of the morbid structure; but to this contingent and subsidiary influence he limits its power. He further believes that every agency which modifies the processes of nutrition and secretion, tends to give rise to the formation of adventitious matter in the cellular structure of

organs. But although M. Andral be entitled to gratitude for his active and successful share in exposing and denouncing the incongruities of Broussaisism, he has seriously lessened the value of his efforts, in respect of cancer, by teaching the startling doctrine that hypertrophy, induration, and scirrhus are, in certain tissues at least, undistinguishable from each other; are, in fact, one and the same morbid state. Reason, as well as the fundamental principles of pathology, forcibly oppose the admission of a dogma of the kind; the microscope demonstrates its utter fallacy.

§ VI. A theory of the origin of cancerous growths, which has attracted considerable attention from the ingenious argumentation and earnest advocacy of its author, was first made public by Dr. Hodgkin in 1829.* The production of cancer is by this doctrine made to depend on the presence of simple or compound encysted structure. "If," says this writer, "we carefully dissect down to the surface . . . of a tumor, in which the process of decay has either not commenced, or has made very little progress, we shall find that the surface, which is next to the mass of the tumor, is more or less smooth and even; and, on raising it, we find that it is reflected over one or more somewhat pyriform bodies, attached by a base, which is generally narrow and peduncular, to some part of the circumference of the enclosing capsule. . . . . It must be sufficiently obvious, that the appearance presented by the section of a tumor such as I have just described must be very materially affected by the direction in which the section is made. If it pass through or near to the point at which the pyriform bodies are attached to the enclosing cyst, it must more or less nearly correspond with the direction which some of these bodies take towards the circumference; and their edges will consequently be seen in the form of radiating lines. On the other hand, if the section be made more or less nearly transverse to the axes of these bodies, their sections will convey the idea of cells of various shapes. If, continuing the dissection, we raise the outer cyst, or the membrane reflected from that which covers the radiating pedunculated bodies, we shall *generally* find, that on one or more sides it dips down deeply into the mass of the tumor. It thus forms part of a septum, which separates one packet of pedunculated bodies from the others, which usually concur to form the mass of the tumor; for it, comparatively, rarely happens that the tumor is composed of a single cyst filled with pedunculated bodies."†

* Med. Chirurg. Transactions, vol. xv. p. 265. 1829.

† Morbid Anatomy of the Serous and Mucous Membranes, vol. i. p. 251. 1836.

These statements involve the consideration of three distinct points: first, the anatomical connexion of encysted structure with cancer; secondly, the formative function of such structure in the production of cancer; thirdly, the real nature and origin of the appearances suggestive of the presence of compound cystoid membranes as an essential element of that growth.

(A.) Serous cysts are undoubtedly sometimes associated with carcinomatous growths. In the first place, as I have already intimated (p.15), a lamina of serous aspect forms, in rare cases, the internal layer of the capsule of encephaloid tumors. But I am not acquainted with any facts proving that this lamina precedes the cancerous substance in order of development; the contrary I consider to be the truth, for the following reasons:—The lamina in question appears to be simply a modification of the inner surface of an ordinary capsule of condensed cellular membrane, which is confessedly, when it exists, formed subsequently to the cancerous mass: the connexion between the cyst and its contents is not necessarily either close or universal, nor, as may often be very readily ascertained, are the "septa" of the tumor productions from it. Secondly, though serous cysts, with contents of different kinds, are occasionally seen in the interior of cancerous growths, I have never yet observed a particle of encephaloid, scirrhus, or colloid actually within the cavity of such contained cysts; though it is far from uncommon to discover a protrusion inwards or partial collapse of some portion of their walls, probably from undue activity of growth of the adjoining stratum of the cancerous substance. The origin of these internal cysts I shall hereafter* endeavour to explain. Thirdly, encephaloid vegetations of various sizes and shapes are occasionally found in connexion with multilocular cysts of the ovary and mamma. They may even be seen protruding into the cavity of those cysts; but I have not been able to ascertain that such vegetations are surrounded by a serous sac developed *within* the original one. It is, I think, evident, that the carcinomatous matter originates in these cases between the external surface of the pre-existing serous membrane and the adjoining stratum of cellular or fibrous tissue, and hence that the extent of surface of the cancerous growth covered with a reflection of the former is always in the inverse ratio of the breadth of base of that product. Laennec had noticed this partial cystic investiture under other circumstances, and attempted to explain it by supposing the cyst in course of for-

* See Part I. Chapter IV. Section I. (*b.*) (1.)

mation; but this hypothesis is untenable: the peculiarity seems to be caused from cancerous matter, produced *outside* a pre-existing cyst, carrying inwards the adjoining portion of the serous lamina, and eventually bringing it into contact with the opposite circumference. In this case the relation of the cancerous structure to the cyst is that of the testicle to the tunica vaginalis; the former is partially invested by the latter, but is without its proper cavity: and, in truth, according to Dr. Hodgkin himself, this is the mode of connexion of the morbid matter and cyst; for it is clearly impossible that the superadded growth should at once be within the cavity of the serous sac, and invested by a reflection of it.

(B.) As commonly stated by its author, this theory makes the existence of encysted structure of primary importance in the formation of cancerous matter,—the presence of the latter involves that of the former. Yet we have just seen that, as long as the mode of connexion of cysts and cancer is clearly traceable, the deficiency of evidence that the generation of the latter can be logically ascribed to the former as its cause, seems unquestionable. Specimens, in which the internal relations of structure have been rendered imperceptible by the progress of decay, or by the reaction and manipulation to which they may have been submitted after removal from the body, cannot be adduced in evidence on either side of the question. Besides this, it has been alleged by Dr. Carswell, who has used very much the same line of argument as the above, in refutation of the cystic theory, that carcinomatous structure, when connected with a cyst, is supplied with blood by vessels not belonging to that membrane. This pathologist admits, and I see no fair reason for dissenting from the opinion as a matter of possibility, that cancerous matter may be thrown out on the internal surface of pre-existing adventitious cysts. But Dr. Carswell does not state that he has actually seen carcinoma so situated; nor have I, as just mentioned, been myself more fortunate. And even were the morbid matter discovered in this site, and under these circumstances, it is obvious the fact would furnish no argument for the reality of a productive faculty on the part of cysts, as contended for by Dr. Hodgkin.

But Dr. Hodgkin himself, in certain parts of his volume, modifies very materially the inference deducible from the general enunciation of his theory. For instance, in one place,* he takes "views of the commencement of the adventitious structure, which exclude the question as to the priority of the cyst or its contents, as the forma-

* Op. cit. p. 362.

tion of both is almost simultaneous, and proceeds *pari passu.*" All claim to formative function on the part of the cysts appears here to be relinquished. In answer to this objection, Dr. Hodgkin has recently written: "I may, perhaps, be allowed to observe that I may be content to leave this point in the same situation with others to which it is most intimately allied, I mean all those productions to which a cellular origin is conceded. . . . . Whilst yet of microscopic size, we find both cysts and their contents; and in their advance to their ultimate condition both pursue their changes in mutual dependence on each other."* It may be rejoined that Dr. Hodgkin has elsewhere distinctly asseverated his belief in the producing power of cysts; for he speaks of a "division of cysts comprising those sacs which *produce*, as well as circumscribe, their contents;"† and to this class of cysts are presumed to belong those assigned to cancer. And, as respects the illustration deduced from the origin of microscopical cells, it is to be remembered that at a certain period of blastemal evolution none but fluid elements exist,—even cells are therefore secondary in point of time as of importance.

Lastly, granting even that the cystic theory were established in its most absolute form, it would shed no light on the mystery of the production of cancer, but simply throw the difficulty a step back, by leaving us to discover the origin of the producing cysts.

(c.) The surfaces, exposed by sections made in different directions through the substance of certain cancerous and other tumors, exhibit appearances of similarity, varying in closeness, to encysted structure. But these appearances (the varieties of the locular character) I believe to be otherwise produced, as will in a future place‡ be explained.

§ VII. M. Cruveilhier, whose laborious attention to pathological anatomy for a number of years entitles his inferences to most attentive consideration, professes opinions concerning the origin of cancer materially different from those held by the majority of his contemporaries. M. Cruveilhier's doctrine embraces two essentially distinct propositions. First, he regards all "heterologous" formations "as the exclusive result of a successive deposition of morbid products in the cellular element of organs;" he believes that "this cellular element is alone affected; that the proper tissue of organs is in itself incapable of undergoing any organic lesion, except hypertrophy and atrophy; that at first rendered hypertrophous by the

* Med. Chirurg. Transactions, vol. xxvi. p. 281. 1843.

† Morbid Anat. of Serous and Mucous Membranes, vol. i. p. 223. 1836.

‡ See § IV. Sect. II. of this Chapter.

state of irritation existing in the neighbouring cellular membrane, these proper tissues subsequently become atrophous, and finally disappear in consequence of the pressure they undergo from the diseased formation." As will by-and-by be seen, there is unquestionably not only much truth in this idea, but it may be carried even further in perfect conformity with reasoning and observed facts.

However, this unalterableness of composition of the organic tissues can scarcely be considered the most important element of M. Cruveilhier's doctrine; for, secondly, "it results from his researches that the formation of cancer, like all nutritive phenomena, healthy and morbid, takes place in the venous capillary system; that from the minute veins the morbid products are poured into the cellular membrane, either by exhalation or through lacerated openings." I shall have occasion to show that the exhalation of ready-formed cancerous matter from the vessels is a physical impossibility, unless on the gratuitous hypothesis (to which, indeed, this author does not appeal) that the coats of those tubes have undergone some change affecting their porosity; the existence of lacerations is likewise purely imaginary. The escape of the cancerous matter from the capillary vessels, it is to be noted, is a point of inferior importance, and apparently rather accidental than otherwise, according to M. Cruveilhier's notions. In speaking of cases in which the uterus looks healthy, though it yields cancerous matter on pressure, he states that the veins are its containing element; but that, as they retain their natural dimensions, there is no atrophy of the proper tissue of the organ. Where there is formation of distinct tumor, the coats of those vessels become enormously distended by the morbid matter, and excessively fragile.*

This second proposition of M. Cruveilhier, as it affects cancer, is evidently only a part of the more general theory, according to which the various phenomena of nutrition, secretion, and inflammation are accomplished, not, as has heretofore been believed, in the capillaries, but in the radicles of the veins. It would be foreign to my present purpose to inquire into the validity of the arguments on which the learned Professor rests his general doctrine; I have at present only to do with the particular evidence adduced by him to prove that carcinoma forms primitively and invariably in the seat he has assigned. Now, in the numerous passages of his great work on Pathological Anatomy, as well as of his minor writings, in

* Anat. Pathol. Livrais. xxvii.

which this theory is emphatically dwelt on, and pronounced to be a demonstrated truth, I find no single fact but the occurrence of carcinomatous matter in the veins advanced in its support. I shall by-and-by inquire whether the inference from the fact is perfectly warranted.

§ VIII. Dr. Carswell has investigated the delicate points under consideration on the correct principle, that, in order to obtain satisfactory insight into their nature, the morbid matter must be observed as soon as possible after production, and its development thus traced, as it were, *ab ovo*. Examining the question in this way, he conceives he has ascertained that carcinoma originates in three positions — in the molecular structure of organs, as a product of nutrition; on free serous surfaces, as a result of secretion; and in the blood.

(A.) "Deposition" in the molecular structure of organs is exemplified by the mode of formation observable in the liver. If a liver studded with carcinomatous growths be closely examined, certain minute spots may be detected, in which a slight change of colour indicates the commencement of the process of morbid formation. This alteration of colour may be limited to a single "acinus," or occur in several of these bodies either successively or simultaneously. The natural hue is supplanted by a pale milk-white, or straw-coloured tint, this alteration being attended with an increase of consistence; but at the same time (and this is represented to be the most important circumstance attending the diseased process) the form and bulk of the "acini" remain unaltered. Hence it is inferred that the foreign substance must be introduced in the same order as the natural elements of nutrition; otherwise a change of bulk would coadvance with that of colour and consistence.

When engaged particularly with the subject of the liver, I shall show that very different conclusions have been drawn by other observers from the same fact.

(B.) The occasional presence of cancerous productions on the free surface of serous membranes is adduced by Dr. Carswell as strongly corroborative of the views just stated respecting the "nutritive transformation" of the tissue of organs; for the distinction between the processes of nutrition and secretion is merely nominal. The analogy is, no doubt, strong; but, before admitting the argument derivable from such presence, it is incumbent on us to inquire whether cancerous substance has been really observed in the alleged situation.

Indubitably, the vast majority of growths connected with serous

tissues are developed in the cellular membrane beneath them. This I have had frequent opportunities of ascertaining by careful dissection of incipient pleural and peritonæal patches; even the growths figured by Dr. Carswell, as illustrating his opinion, appear to be contained in a pouch of the distended serous membrane. Again, cancerous tumors of the meninges, when connected with the arachnoid, originate either in the cellular tissue between the internal surface of the dura mater and the parietal portion of the serous membrane, or under its cerebral lamina; their investment by the arachnoid is demonstrable by dissection. In the greater number by far (speaking relatively, for the total number on record is very small) of cases of cancerous production connected with the pericardium, the relations of the serous membrane and the adventitious matter were the same. But the question, it must be admitted, is not one of frequency; if carcinoma have actually been formed in a single instance on a free serous surface, the possibility of such seat of generation is established. Renewed observation has within the last two years convinced me that cancer may be evolved in this situation; and that in certain instances the accurate investment of the new growth by adventitious epithelium gives a delusive appearance of the mass having been produced behind, and with the progress of its enlargement having pushed forward, the peritonæum. But can we, pursuing the train of inference adopted by Dr. Carswell, adopt the opinion that the locality of evolution under these circumstances proves the morbid matter to be simply "separated" from the blood? Unquestionably not; the fact will presently be seen to be otherwise, and simply explicable.

(c.) Before passing to the next point in Dr. Carswell's general doctrine, bearing as it does upon the condition of the circulating blood, I shall briefly state in chronological order the chief facts established concerning cancerous impregnation of that fluid, and the conclusions drawn from them by different pathologists.

Mr. Langstaff* noticed the fact of the presence of cancer in the interior of the veins. In a case of encephaloid disease dissected by him, "some of the veins were filled with matter of the same consistence, without its having formed any adhesion with their coats." But he does not seem to have attached any importance to the discovery; and the earliest careful observations respecting the presence of cancerous matter in the vascular system appear, as far as I can ascertain, to have been those made by M. Velpeau. In 1824 this

* Med. Chir. Transactions, vol. viii. p. 286. 1817.

inquirer read an essay to the Academy of Medicine containing two cases related with much precision. In one of these an encephaloid mass communicating with similar structure in the kidney was found in the vena cava; and an enormous coagulum, extending from the iliac veins through the cava inferior to the right auricle, presented from place to place the characters of encephaloid matter of varying firmness. The coagula in the heart had apparently formed after death; yet in one of them, placed between the walls of the ventricle and the tricuspid valve, was contained "some substance of purulent *or* encephaloid aspect, like that contained in the kidney." In 1829 M. Andral announced his having discovered carcinomatous matter in the trunk and minute ramifications of the pulmonary artery; in other instances, in the branches of the vena porta, &c. In the same year M. Cruveilhier, in describing a case of cancer of the uterus and vagina, stated that on cutting the latter membrane slantingly, he ascertained, with the aid of a lens, that the venous areolæ of the vaginal mucous membrane were crammed with encephaloid easily expressible from their interior.

Facts of this kind have been observed of late years by all pathologists; nothing can be more thoroughly established than their reality and their frequency. It is obvious that they prove the presence of cancer in the interior of the venous system; but they have, besides, been supposed by various writers to justify the deduction of certain important propositions. Thus M. Velpeau concluded, from an examination of all the particulars of his cases, that the encephaloid matter in the midst of the venous coagula was not a production of the internal tunic of the vessels, (that tunic was healthy, and not closely connected with the adventitious product,) but actually formed in those coagula; and further, that the germ of all such "heterologous" productions exists *primitively* in the blood.* M. Andral partly coincides in this opinion, maintaining that the presence of the adventitious substance in the circulating fluid depends upon transformation of the fibrin of the latter into the former. M. Cruveilhier discovers in the same fact, as I have already intimated, a proof that cancer is a product of secretion by the coats of the capillary veins. M. P. H. Bérard entertains no doubt that in certain cases observed by him the presence of the foreign formation in the veins resulted from partial destruction of their coats by masses produced outside them (as long since, I may observe, described by Sir C. Bell);† but he admits that the fact of free

* Rev. Médicale, t. i. p. 357. 1825.

† Surgical Observations, vol. ii. p. 405. 1818.

encephaloid masses being found in the interior of vessels with sound parietes is not thus explicable.

It is to be noticed that none of these pathologists have endeavoured to prove, what is absolutely necessary for the establishment of the doctrines of the production of encephaloid matter in the blood itself or by the coats of the capillary veins: they have not aimed at showing that such matter is ever detected in the venous system in cases, where no generically allied morbid formation has pre-existed in the cellular structure of the solids. Hence they have furnished no evidence contradictory of the much easier and more natural explanation that the germina of the diseased masses in the venous coagula had found their way into the veins by absorption, and vegetated in their newly-found locality.

Such was the state of knowledge on the subject, when Dr. Carswell announced himself an advocate of the origin of carcinoma in the circulating blood. This pathologist does not, like certain of his predecessors, found his conviction on the mere existence of cancerous matter in the veins; he affirms not only that the morbid production may be discovered in vessels having no direct communication with an organ affected with the same disease (as when confined to a small extent of the vena porta), but that there are cases in which the venous blood alone is found to be the seat of the morbid accumulation. Of the first of these observations I readily admit the accuracy, but it by no means disproves the fact of venous absorption. There does not seem to be any direct communication between the parenchyma of the lungs and the bones of the extremities; yet the well-known experiments of M. Cruveilhier show that a single globule of mercury introduced into the medullary cavity of the femur may be detected weeks after in the pulmonary tissue. Nay more, they have proved that mercury, introduced into any part either of the general or portal venous systems, may reach in the former instance the capillaries of the liver, in the latter those of the lung. With respect to the second observation, I have to remark, that among a vast number of post-mortem examinations, conducted either by myself or by other persons familiarized with such researches, no case of the description referred to has been encountered; I have never heard of one; and I have in vain searched periodical works for details demonstrating the reality of its occurrence. It is to be remembered that, granting cancerous matter be discovered in the interior of the blood-vessels, it would be necessary to prove its absence not only from the cellular structure of the trunk and extremities and various viscera, but from the sub-

stance of the bones and the meshes of the endosteum, before we become entitled to affirm that it is exclusively contained in those tubes. Again, the morbid matter is not discoverable, or, to keep more accurately within the limits of fact, has not been discovered, in arterial blood or in the arteries;* this circumstance interfering as it does with the admission of Dr. Carswell's doctrine, he attempts to account for by supposing that the contractile power of the arteries prevents stagnation of their contents,—a supposition to me far from satisfactory or convincing. Unsupported then as it was by a full narrative of the cases upon which it professed to be based,—deficient also in testimony to its accuracy on the part of other observers, the doctrine of *primary cancerous alteration of the blood*, as taught by Dr. Carswell, could not be regarded otherwise than as matter of hypothesis. Yet it is but just to add, that even in the unfinished and actually erroneous form in which it issued from his hands, this doctrine rather failed from absence of evidence to uphold it, than from its opponents having adduced any important facts completely refuting it.

(D.) Further, as Dr. Carswell regards the deposition of carcinoma, through the processes of nutrition and secretion, as the result of its *separation* from the blood, cancerous vitiation of that fluid, preceding the origin, and coexisting with the evolution of the local malady, is a *sine quâ non* of the development of the latter: according to him, the blood is, in a word, the *sole primary seat* of the disease. Hence the material constituent of the affection is in circulation in cases, for instance, of scirrhus of the mamma, which remains almost stationary for years, is unattended with secondary formations in other parts of the frame, and gives rise to no marked constitutional disturbance. Now this idea is by others rejected as inadmissible: can we readily comprehend, they allege, how blood holding cancer in suspension can furnish the materials of natural secretions, and perform its functions in such manner as to cause no perceptible deviation from the standard of health? How comes it again, it is urged, if this doctrine be well-founded, that after the removal of a cancerous tumor the process of cicatrisation frequently goes through its stages with regularity, though, when the patient dies, one or more viscera are found affected with the disease in such manner as to leave little doubt, in some cases none, that the morbid growths discovered in them were in existence before the per-

* M. Cruveilhier believes that he has occasionally observed the arterial branches of gangrenous encephaloid blocked up with whitish matter; but this is obviously a special case.

formance of the operation? If these facts are reconcileable with the theory espoused by Dr. Carswell, he has at least failed to make manifest their compatibility therewith. For my own part, while distinctly avowing, on a former occasion, that the difficulty of explaining the apparent contradictions involved in this doctrine furnished no *proof* of its unsoundness, I rejected it as unestablished by then existing experience: whether increased observation of the structure and mode of life of morbid formations now appear to me to warrant the admission of the primary production of cancer in the blood, will (p. 52) presently be seen.

§ IX. Such I believe to be a fair sketch of the doctrines held on the subject of the origin of cancer, previously to the general introduction of the microscope in the investigations of morbid anatomy. I shall now proceed (while explaining the views which I entertain on the subject generally) to the statement of the facts and principles of which, I conceive, the disclosures made by that instrument justify the reception. I must premise by observing, that, in addition to the occasional mixing up of actual questions of etiology with the consideration of the origin of cancer, three points really very distinct in nature have, in investigating this complex question, been invariably more or less completely confounded by writers; these three points are:

(A.) The nature and properties of the formative material in which the new mass originates;

(B.) The seat or locality in which it originates and germinates;

(C.) The process by which this formative material is itself generated.

(A.) *Nature of the formative material.*—A general survey of Adventitious Products shows that a certain proportion of them originates in a species of fluid to which the name blastema has been given: these products may, consequently, be termed *blastemal.** The *physical* characters of this fluid, when destined to evolve the well-known material, Pus, have been demonstrated by different observers† at the very earliest moment of its existence. Direct observation of the blastema of cancer at the instant of its production, and while the entire existing material is yet a simple fluid, has not been effected; its characters are not, therefore, matters of demonstration. But their

* See Introduction, p. 3. † Henle, Wood, Gueterbock, Vogel, &c.

nature may, perhaps, be plausibly inferred as follows: In the first place, the physical characters of pus-blastema do not, to our existing powers of discrimination, perceptibly differ from those of the germinal liquid from which the various natural structures form. Secondly, blastema of wholly similar qualities generates natural structures perfectly dissimilar: muscle springs into existence in contact with cellular membrane, nerve in close proximity with bone, all from one homogeneous liquid. Thirdly, the blastema of cancer when demonstrable, that is, as contained in the substance of growths already evolved, and forming the matrix for addition to their substance, differs in nowise from that of pus or of the natural tissues. The physical qualities of cancer-blastema under the last-mentioned circumstances may for these reasons be presumed to be identical with those of the primary drops; and the qualities of these first-formed drops hence surmised to be fluidity, slight viscidity, semi-transparency, homogeneousness, and total absence of solid particles.

Of the *chemical* constitution of cancer-blastema, when first produced, nothing is known from actual experiment.*

To state that the *potential* or vital qualities of cancer-blastema, are peculiar, and unlike those of the fluid from which other blastemal products are evolved, is simply to affirm in other terms the self-evident proposition that existences, perfectly different in nature, must be formed from materials endowed with different vital tendencies. The real points to determine, (and I know none of higher import,) are in what the special difference, in the instance of each product, consists, and how and where it is effected. Concerning the nature and essence of this special difference, it is almost needless to say existing knowledge does not permit the pathologist to hazard even a conjecture. As respects the character of the process by which it is impressed on each blastema, and the locality in which that process is accomplished, three cases are possible: either the change takes place wholly, while the germinal liquid circulates with the blood, and consequently within the vessels; or, it arises during filtration of that liquid through the walls of the vascular tubes, in consequence of certain physical, chemical, and vital modifications having occurred in the substance of these walls; or, lastly, it is produced in both these ways. It will be rendered probable by considerations upon which I shall enter presently, that the peculiar attributes of each blastema are mainly impressed upon it, while

* See Chapter II. p. 30.

still mixing with the general circulating fluid; but that to some degree its individual qualities are acquired during the process of filtration through the vascular parietes. Upon the intimate nature of the changes in the walls of the vessels, modifying the results of filtration, it is useless to indulge in hypothesis.

The blastema of cancer, there is every reason to suppose, is, like ordinary exudation-matter or coagulable lymph, essentially composed of liquor-sanguinis—but of liquor-sanguinis modified in its vital qualities. Whether the blood in substance simply extravasated from its vessels, and unaltered in its apparent physical characters, be capable of acting as a blastema for the generation of cancer, is a question which merges in the more general one, whether blood in substance be organisable? And this question is still unanswered. John Hunter, followed by Abernethy, maintained the affirmative; but the observations of our great surgeon do not by any means satisfy the inquirer that the masses, assumed to be simple coagula, were not in point of fact mingled more or less extensively with exudation-matter. Mr. Dalrymple,* some time since examining a coagulum (injected by Mr. Busk) seated between the periosteum and tibia of a scorbutic individual, found the mass apparently permeated by vessels of new-formation. The form, mode of arrangement, and general characters of these vessels appear to justify the idea that they are really new formations; but no proof of any kind is adduced to show that coagulable lymph may not have been present amid the extravasated blood. More recently Mr. Dalrymple,† not contented with ascertaining the fact of vascularization of scorbutic coagula, has succeeded in tracing the progress of cell-development in the substance of such coagula. But if vascularization existed, the humbler grade of organisation, signified by cell-evolution, was to be expected; and the new observations of Mr. Dalrymple do not remove the objection which, in this point of view, may be raised to the old.

But these observations very satisfactorily show that the presence of blood in substance will not prevent the occurrence of cell-evolution and of vascularization, where the other conditions of its accomplishment exist. And in this state the question must, for the present at least, be allowed to remain.

(B.) *Seat of germination.*—Derived as cancer-blastema is, like all nutritive and secretive materials, from the blood, there are three possible situations in which its evolution may take place:

* Med. Chir. Trans. vol. xxiii. p. 205. 1840.

† Med. Chir. Trans. vol. xxvii. p. 70. 1844.

1. the interior of the vessels;
2. the substance of the vascular walls;
3. spaces outside the vessels.

(1.) Cancerous matter is, we have seen, frequently found in the interior of the veins; the question arises, how it comes there. Conceivably in either of two ways,—by the absorption and subsequent germination of certain elements of growths pre-existing elsewhere; by primary evolution of germinal fluid, which has never escaped from the vessels. I shall hereafter* show the extreme probability, if not certainty, that in the great majority of cases the existence of intra-venous cancer is the result of the former process; for the present I shall speak only of the latter.

The embryonic production of a fragment of natural tissue within the vessels is a sort of anomaly of nutrition of which no example, as far as I am aware, has ever been witnessed. Again, simple exudation-matter or coagulable lymph, which appears to be nothing but pure liquor-sanguinis of highly plastic force, does not undergo evolution within the vessels; its escape from these is a necessary previous step. Analogy is consequently opposed to the admission of a germinating power in non-exuded cancer-blastema. Still the impossibility of germination under these circumstances is not proved, and there is no solid *à priori* motive for supposing that evolution may not take place in particular instances,—when, for example, any special obstacle exists to the escape of the fluid from the vessels. Thus, in structures of the erectile class, as the spleen, we might expect to find germination of primary blastema accomplished in the loculi of the organ; and certainly there is some evidence of its actual occurrence.† It is to be observed too, that if Dr. Carswell's observation (p. 47) respecting the occasional limitation of cancer to the vessels alone were confirmed, the explanation now given must be admitted.

But, in granting the possibility of cancer-blastema germinating in the interior of the vessels, I by no means become a partisan of the doctrine taught by Dr. Carswell, that the material element or solid constituents of tumors exist primarily in the blood, and in fact circulate in suspension in that fluid, before they are aggregated into masses. The simple fact that a cancerous tumor does ever, in any instance, present itself outside the vessels, utterly overturns that doctrine; for, had the solid constituents existed as such within those tubes, they never could, unless through the medium of rup-

* See Chapter V. Sect. I. § IV. See Part II. Chapter I. Sect. Spleen.

tures of tissue, have made their way out of them: the size of their elementary particles, compared with that of the pores of the vessels, demonstrates this.

It is clear that what has been spoken of by writers as the "conversion of blood into encephaloid matter" is nothing more than an appearance produced by the evolution of primary blastema or of absorbed cell-elements in the instertices of a coagulum: the idea of an actual change of blood-corpuscles into cancer-cells is an absurdity. And, further, the presence of carcinomatous masses within the veins, as a result of perforation of their walls and protrusion inwards of growths produced outside them, (a condition observed in rare instances,) has evidently no connexion with the present subject.

(2.) Published cases prove the occasional existence of cancer in the substance of the coats of the veins. Nodules of encephaloid exhibit themselves in the very centre of the venous tissue, or attached to the inner aspect of the vascular wall by a simple or double peduncle, (not unfrequently dilating the vein, as M. Cruveilhier observes, into an ovoid ampulla, simulating a cyst.) Little tumors of the latter kind are often evidently in vascularized connexion with the venous tunics,—a fact arguing in favour of, though it by no means demonstrates, their production thereby, in as much as apparently simple coagula may sometimes be shown by injection to be in vascular communication with the adjacent parietes. Tumors presenting themselves in the former site must have been formed actually in the venous tissue; and their formation is intelligible by supposing either that blastema, furnished by the blood circulating in their interior, has germinated during the process of filtration through the vascular coats; or that the blastema was originally supplied by the vasa vasorum.

(3.) It results indirectly, then, from the rarity of cases in which either the interior or the walls of the blood-vessels are the seats of germination of cancer-blastema, that the spaces external to these tubes must be the common site of the phenomenon. Now the possible positions outside the blood-vessels are: first, the inter-vascular interstices of the various tissues and organs; secondly, the free surface of serous membranes; thirdly, the free surface of mucous membranes; fourthly, the sub-epithelial surface of the skin; fifthly, the surface or substance of extra-vascular tissues. It is for observation to decide in which of these situations germination actually occurs. In the vast majority of cases, the evolution of blastema takes place in the first-named of them.

I have already stated my opinion (p. 45), that the free surface of serous membranes sometimes supports cancerous matter; but such cases are, there can be no possible doubt, of considerable rarity. Except in the instance of the Fallopian tubes and uterus (and possibly of the bronchi), I know of no mucous surface on which cancer has ever (independently of solution of continuity) been actually seen.

Certain extra-vascular tissues are, as a well-known fact, destroyed by advance of circumjacent cancerous disease; but the process by which the destruction is effected has not been accurately defined. Articular cartilages may be adduced as exemplifying the circumstance; and it appears to me perfectly consonant with reason, and supported by the very strongest and most direct analogy, to suppose that this extra-vascular tissue imbibes blastema thrown out by the vessels of juxta-posed vascular structure, and that this blastema subsequently goes through the same series of changes as if infiltrating a vascularized tissue. It is a thoroughly established and familiar fact, that though the cornea ranks among structures deficient in blood-vessels, and is therefore incapable of undergoing the earliest or congestive stage of inflammation, still it becomes affected with the second stage of that process, by imbibing exudation-matter effused in its vicinity by the vessels of circumjacent vascular structures. This truth, which is so conveniently demonstrable on account of the natural transparence and acquired opacity of the cornea, is more difficult to prove, but, I am persuaded, not less real, in the case of cancer of the articular cartilages.

(c.) *Nature of the process by which the formative material is generated.* — Few questions have given rise to more intemperate discussion among pathologists than that of the nutritive or secretive origin of morbid products. It becomes obvious, from what has been stated in the present section, that this question has, in the existing state of knowledge, lost all its interest, if not its rationality. The exudation-process (that by which unhealthy materials, cancer-blastema among the rest, are thrown out from the vessels) is neither one of secretion nor of nutrition; but may be a substitute for either. Besides, it is clear, that in certain rare cases, of which I have been led to admit the existence, (I mean those wherein the formative blastema of cancer germinates within, or in the parietes of the vessels, instead of externally to these,) no action, succedaneous to that of nutrition or secretion, takes place at all.

SECTION II.

GROWTH.

The last section has, within certain limits, made us acquainted with the properties of the blastema, from which cancer is developed. The process of development next claims consideration. I shall first concisely describe the ultimate solid elements of the structure, and then examine their developmental relations.

§ I. The ultimate solid constituents of carcinoma are granules; nucleated cells of spherical, elliptical, irregular, or caudate shape; free nuclei; and fibrillar substance: with these is associated in variable quantities a semi-transparent fluid,—blastema obviously apt for the generation of new solids. Capillary vessels are always discoverable. With these essential elements fat-globules are, from the constancy of their occurrence, almost entitled to take place. Compound-granule corpuscles, melanic matter in the form of cells and free-granules, saline matters, and certain other substances occur as accidental and contingent elements.

(*a.*) *Granules.*—The granule is a solid body, and commonly of spherical outline, when, as has been presumed, exhibiting its perfect condition. Its shape, however, varies so greatly (it is often perfectly amorphous), that deviations from the spherical form are perhaps in many instances original, rather than impressed upon it by accidental circumstances.

Granules exist in all, and are excessively abundant in some, varieties of cancer,—forming a very considerable proportion of the entire mass in certain scirrhi. In diameter I have found them to average $\frac{1}{10000}$ of an inch. They are seated either in the interior of cells, free between these and floating in the infiltrating blastema; or (as in fasciculate cancer) set in abundance upon fibres. See Plate I. Figs. 8, 12.

(*b.*) *Cells.*—Some portion of every specimen of every variety of cancer consists of certain hollow *spherical* bodies, termed cells. Their abundance varies; excessively numerous in colloid, they are comparatively few in scirrhus, and may be absent in some fragments of a mass of fasciculate cancer: their quantity differs even in different specimens of the same species of cancer.

Slight elongation of the spherical cell in opposite directions sometimes gives it an elliptical or fusiform outline; or in some cases, perhaps, this is the primary form. Occasionally the cell is flattened

and discoid. In respect of size they vary within tolerably wide limits, and this because it is the nature of some (of those of colloid, for instance) to go on increasing in diameter; of others (those of scirrhus) to retain persistently their primitive dimensions. As extreme measurements, I have found diameters of $\frac{1}{900}$ and $\frac{1}{3500}$ of an inch; the mean size appears to be about $\frac{1}{1900}$ of an inch. See Plate I. Figs. 6, 10, 11, 14.

Two chief types of arrangement of cells (as Müller was the first to show) are observed. In one the cells are set beside each other, and cohere by their apposed walls; this is the case in colloid: in the other the cells, though in close proximity, remain free; scirrhus exemplifies this condition.

The walls of cancer-cells generally present an opaque, oval, flattened body, from which the cells themselves sprang: this body is the parietal nucleus.

The thickness and transparency of the cell-wall vary; but, so far as I have observed, not uniformly in any particular species of cancer (or, I may add, of growth generally) so as to constitute a distinctive character. The varying clearness of definition of the nucleus in some cases obviously depends on these properties of the cell-wall.

The cell-wall is sometimes collapsed; sometimes full and tense. This depends on the nature and amount of the matters contained within the cell, especially upon the quantity of fluid present.

The contents of cells are a certain *fluid; granules; nuclei; sub-cells.*—*Granules* exist in, and seem sometimes almost to fill, the interior of scirrhus-cells; when set free, they frequently exhibit the phenomenon of molecular movement.—One or more free *nuclei* are sometimes found in the interior of the cells of colloid, generally, however, more or less completely surrounded with young cells. It is probable, but not certain, that the granules contained in cells of scirrhus are in truth nuclei of future cells. This would be rendered positive, were Müller's statement, that the cells of scirrhus sometimes contain not merely granules, but also young cells provided each with its nucleus, satisfactorily established: I have commonly failed in discovering this evidence of endogenous development in well-marked specimens of scirrhus.—*Young* or *sub-cells*, small hollow vesicles, themselves provided each with a parietal nucleus, are distinctly visible in the cells of colloid.

Caudate or *spindle-shaped* cells, first described by Valentin and Müller as elements of tumors, have the aspect of simple cells having two opposite points of their periphery prolonged into very

minute fibrils, thickest at the line of continuation with the cell, and becoming gradually narrower until their fineness renders them almost imperceptible. One fibril only may arise from a cell; or, in addition to the two opposite ones, a third may spring from some other point of the surface: I have never seen a greater number than this. Usually single, the fibril is sometimes bifid. The cell itself is furnished with a parietal nucleus, and frequently contains granules in its interior. See Plate I. Figs. 6[b], 7.

The abundance of these modified cells varies greatly in different growths, and in different specimens of the same growth. I have never, as Müller appears to have done, met with an encephaloid mass composed mainly of these corpuscles. They have not appeared to me specially abundant in tumors in which melanic matter had been deposited.

They occur in scirrhus; Müller has twice seen them in the jelly-like matter of colloid; their more usual seat is in encephaloid. Their frequency and importance in cancerous structures have been greatly overrated.

I have in a few instances observed the linear arrangement of juxta-posed caudate cells (described by Valentin and Müller) producing a rude imitation of fibrous structure; as a general rule, however, these cells are scattered irregularly through the mass, and never, so far as I am aware, form (while retaining the character of caudate cells) a firm fibrous structure.

(*c.*) *Nuclei* are formed in cancerous growths; either free, or in connexion with cells, and then attached to the wall or lying unattached in their interior.

Free solid corpuscles, of somewhat greater dimensions than granules, are found in scirrhus; these (whether generated in the spot where they are discovered, or primarily produced in the interior of cells, and subsequently set free by the rupture and crumbling down of the latter, as suggested by Müller), must unquestionably be regarded as the germs of future cells, in other words as nuclei. See Plate I. Fig. 14.

The parietal is much more common than the central nucleus; of the latter, as occurring in scirrhus, I have already spoken.

Parietal nuclei are generally easily recognised by their being more opaque than the cells to which they belong. They absorb various coloured substances (solution of tincture of iodine for example) more readily than the cells themselves,—whence an easy mode of demonstrating them.

The diameter of the nucleus of cancer-cells varies between $\frac{1}{3500}$

and $\frac{1}{3000}$ of an inch, averaging $\frac{1}{3200}$ of an inch. The larger are generally to be seen in the cells of encephaloid, the smaller in those of scirrhus. The nucleus is relatively large in young cells.

The nucleus contains in its interior from one to four clearly defined bodies, the nucleoli,—themselves probably containing within them sub-nucleoli, but such corpuscles are not visible with a power of 400 diameters.

(*d.*) *Fibrous substance* occurs in cancerous tumors under four forms.

(1.) The primary cells of cancer, as of other growths, lie in some cases in close juxta-position; in other instances inter-spaces more or less considerable exist between them, filled with a material known generically as inter-cell-substance. This substance may be fluid or solid. Where fluid, it is nothing more than blastema, varying in quantity, and regulating in some measure the consistence of the mass. Where solid, as for instance between the cells of the largest class in colloid, this substance is fibrous,—the characters of the filaments being more or less closely similar to those of natural fibrous or cellular membrane. The stroma of scirrhus, too, consists of pure fibrous tissue; and the abundance of such tissue gives its special character to that species of cancer. See Plate I. Figs. 10[a], 13.

(2.) A pseudo-fibrous appearance, as has already been mentioned, is sometimes produced in certain growths abounding in caudate cells.

(3.) The post-peritonæal tumor, already referred to (p. 17), contained peculiar fibres, cells, and granules. The fibres were excessively transparent and delicate, requiring to be looked at in shadow, to be distinctly seen. Their surfaces were studded with granules in abundance; none of these appeared seated in their substance. The cells varied in diameter from $\frac{1}{2500}$ to $\frac{1}{2000}$ of an inch; the majority had a distinct parietal nucleus; of some the contents were simply granular. The creamy fluid expressed from the growth contained cells of larger size. See Plate I. Fig. 12.

I have examined several soft cancerous growths, breaking with a sharp fracture, and essentially composed of fibrils (studded with granules) differing from those existing in the specimens just spoken of, by being opaline and unassociated with cells. It is impossible to look at these fibrils without being struck with their similarity to those of the buffy coat of the blood, or without conceiving the idea that blastema has been produced in connexion with extravasated blood. Such fibrillar tumors show that (as Müller had also recognised) the hyaline or transparent character is unessential. He

asserts the constant absence of cells; but the description above given proves they may be present.

(4.) Delicate, non-adherent, broken fibrils occur in most specimens of cancer. See Plate I. Fig. 8.

(*e.*) *Fatty matter.*—I have scarcely ever examined a cancerous growth (the only exceptions have occurred in the case of colloid and fasciculated cancer) without discovering fat-cells and free oil-globules in more or less abundance. In some cases their number is so great as to render it matter of reasonable conjecture that they are furnished, in some measure at least, by the original fat of the body. Their size varies; they may exist isolated, or aggregated into small masses. See Plate I. Fig. 8. When fat abounds in these growths, it appears to have the effect of altering the form of the cancer-cell.

Crystals of cholesterin are sometimes discoverable in cancer.

(*f.*) *Compound-granule corpuscles* occur in the substance of cancer, with precisely the same characters they exhibit in inflammatory exudation-matter. (See Plate I. Fig. 4.) These corpuscles I have especially observed in the softened, buff-coloured substance forming the so-called reticulum of apinoid scirrhus, as described at p. 24.

(*g. h.*) Of *saline crystals* (see Plate I. Fig. 11[b],) and *melanic matter* I shall speak hereafter. See p. 82.

(*i.*) *Blood-vessels.*—Cancerous growths of all descriptions are possessed of vessels. These vessels are of two classes: 1. they originate *de novo* in the morbid substance, and their contained blood exhibits an oscillatory movement independent of the general circulation; 2. they are formed by the looping- or extension-process, from the vessels of the surrounding tissues. With the progress of things the tubes of the former class inosculate with the latter; but as vessels are in constant course of formation, so long as the growth of a tumor continues, some ramusculi, unconnected with the general circulation either of the body or even of the tumor itself, are always to be found. Dr. Carswell gives the name of *proper* circulating system to the isolated ramuscules, in contradistinction to that of the *collateral* system consisting of tubes, manifestly continuous with the surrounding vessels. The predominance of either of these systems appears to vary with the consistence of the growth; the collateral is most abundant, while the new structure is firm and resisting; the proper, under the contrary circumstances.

The appearances exhibited by the isolated system of vessels in the course of the changes leading to their formation are, as

visible with the naked eye, as follows:—In one part of a tumor may be seen some minute unconnected points of blood; at another appear a number of such dots united in linear juxta-position, so as to form a streak of blood uninclosed in any distinct vessel; elsewhere a vascular investment is found for a similar streak; further on, a similar piece of delicate tube divides at each extremity into a number of tapering ramifications, assuming a stellate or tufted arrangement.

In regard of the mode of evolution of the two classes of vascular tubes there is nothing particular to be said; it is the same as that observed under all circumstances in the generation of adventitious vessels.

The quantity of vessels differs greatly, not only in different species of cancer (encephaloid being the most vascular, colloid the least so), but in different specimens of the same species.

To the system of isolated tubes, the remark of Laennec, that the walls of the vessels of encephaloid are very thin in proportion to their calibre, may be understood, more especially, to apply. Their venous or arterial character is a subject of dispute. According to Dr. Carswell they are frequently varicose, and have altogether much more a venous than an arterial aspect: to Dr. Hodgkin they appear to consist of the capillary vessels of Bichat on a large scale, and their tendency to assume the arterial or venous quality to be chiefly determined by fortuitous circumstances: Cruveilhier authoritatively affirms that they are veins—an affirmation generalized in the statement, that arteries of new formation are never found in adventitious structures.

The general impression, however, derived either from the aspect of the vessels of cancer, or from the results of injection, appears to have been that they were essentially arterial. Until of late, no particular inquiry had been made into the condition of the veins of these growths; pathologists being contented with ascertaining that cancerous matter (identical with that composing their own substance) may be frequently found in the larger veins on the surface of tumors, and traced into the adjoining venous trunks. In 1830, however, Professor P. H. Bérard injected with all necessary care the arteries and veins of the neck of a subject who had died with two non-ulcerated encephaloid tumors in that region. On dividing the morbid masses in different directions, the usual characters of arterial injection were discovered; but the result as regards the veins was of a very different kind. The capsule investing the tumors presented a venous rete interlacing

with that formed by the arteries in the same situation; but the closest search failed to detect a single venous tube, or even black point in the substance of the tumor. This failure could only be attributed to the total absence or impermeability of those vessels, for the venous capillaries of the neighbouring organs were admirably injected. Further examination explained this curious result, by showing, it is said, that the minute veins were completely obliterated with encephaloid matter. But it is to be apprehended, that though venous obstruction may be a common phenomenon in these tumors, yet complete obliteration is an impossibility, so long as their vitality persists; for, if arteries convey blood to a part, veins must be present to carry it back. Nor do I well see how a total deficiency of venous system in a new growth itself can, as M. Bérard conjectures, be atoned for by a supplementary venous circulation in the adjoining tissues.

The intimate texture of the new vessels of cancer has not been submitted to microscopical examination; it in all probability differs but slightly from that of newly-formed natural vascular tissue.

The calibre of these vessels differs considerably in different parts of their course — a condition which has been described as varicoseness. This character exists in all vessels at their period of origin (even in those of the vascular area of the embryo), and is in nowise distinctive of those of cancer.

(*k*). Lymphatic vessels of new formation have not been detected in cancer. Laennec's notion that they must exist, conceived in consequence of his having known the substance of an encephaloid mass exhibit a yellow tinge in an icteric patient, is evidently unsound; the fact is otherwise simply explicable. I have seen the same tint in post-peritonæal cancer, in persons perfectly free from jaundice. And it may be observed, that the adventitious generation of lymphatic vessels is, under any circumstances, a questionable phenomenon. The observations of Schroeder van der Kolk on their formation in false membrane require repetition.

(*l*.) Generation of *nerve* does not occur in cancer. The only nervous filaments discoverable in this morbid growth are those of the tissues, amid which it has chanced to be developed; these occasionally traverse its substance in different conditions, to be elsewhere referred to. Maunoir, misled by certain physical and chemical characters of encephaloid, by the fact of its development in the tissue of the brain and nerves, and its similarity of constitution to the growths from, or protrusions of, the brain in cases of hernia cerebri, conceived that it was actually composed of effused

nervous substance. This hypothesis does not require serious refutation.

§ II. It appears from this description, that the proper structure of cancer must be, and is, evolved in contact with arterial pseudo-tissue; — in other words, that out of the same fluid blastema, and at one and the same time, are produced cancer-cells and cells destined to form structure closely similar in all its properties to one of the natural tissues of the body. This simple fact (which seems to have escaped notice altogether) almost suffices in itself to prove that the mode of development of cancer-blastema—the evolution of its cell — must be identical with that of the blastema of the natural tissues.

But the same difficulty, which has been experienced in tracing the mode of production of the cell of natural structures, exists in respect of the cancer-cell. Two modes of development have been described. In one the cell is a molecular vesicular body from the first, and produces within it a secondary body—the nucleus—which is the embryo of a future cell: in the other, granular matter is first precipitated from the blastema; this granular matter forms a nucleus, around which the cell forms. The former mode of development appears to be that which prevails in natural structures.* It has appeared to me, that both may be seen in cancer. The latter only was described by Müller.

The spherical cancer-cell being formed, the production of the caudate cell follows as an effect of elongation of opposite points of its circumference. And these caudate cells eventually pass into the state of filaments, and form the elements of fibrous formation. Such is the generally admitted notion. But it appears to me that, as matter of theory, caudate cells must also be produced from spherical non-cancerous cells; inasmuch as fibres, in no important point distinguishable from those of natural cellular tissue, are produced in these growths. And it is certain that the caudate corpuscles, visible within cancerous tumors, do exhibit different characters; though to classify them, and connect one more particularly than another kind with the subsequent fibre is at present beyond my power.

The development of fibro-cellular tissue in cancer throws no special light on the question whether such development can be effected without the pre-existence of cells, and (as Henle † main-

* Mr. Paget has collected much interesting matter on this subject in his *Report*, in the British and Foreign Medical Review, vol. xix. p. 565. 1845.

† Allgemein. Anat. S. 198.

tains, in respect of natural cellular membrane) from elongation and linear juxta-position of nuclei.

The similarity of the mode of production and evolution of the cancer-cell to that of natural textures led Müller to refuse the character of "heterologousness" to cancer. But, it is obvious, such identity simply shows, that the "heterologous" character, visible and palpable as it is, is produced either—first, by a different arrangement and mode of combination of ultimate physical elements, not only apparently but really the same as those constituting natural tissues; or, secondly, that the microscopical particles we observe are in reality dissimilar, though to our limited powers of appreciation they appear identical. The production of "heterologousness" may be understood, on the first principle, by considering that calomel and corrosive sublimate are certainly "heterologous" to each other, though both are formed of atoms of mercury and chlorine; the atoms are differently arranged and combined: or, upon the second principle, by the apparent impossibility of admitting that cells producing natural tissues of various physical and functional qualities can, though appearing so, be in truth perfectly identical.

§ III. The consideration of the mode of *enlargement* of cancerous tumors implies that of two distinct questions: (*a.*) the manner in which nutritious material is conveyed to the seat of primary exudation; (*b.*) the manner in which that material is appropriated and evolved.

(*a.*) Cancerous tumors are supplied with nutritive materials by vessels, precisely as the natural tissues; and in them, as in the latter, the different vessels either (1.) permeate the substance of the entire mass; or (2.) their ramifications spread through a portion only of it; or (3.) they merely reach one of its surfaces. In the first of these cases the mass, fed interstitially, grows by the process termed intus-susception; in the third, the assimilable fluid can only be thrown out on the surface, and is either evolved here (growth by accretion), or is imbibed by the mass, in the interior of which it germinates; in the second, both modes of enlargement prevail.

(*b.*) The materials destined to effect the enlargement of cancerous masses are exuded like the first drops, in the condition of a structureless fluid, which becomes more or less solid by the generation of cells. The mode of this continuous cell-generation differs in different cases.

(1.) Microscopical examination has shown that some primary cells contain within them the nuclei of a second generation of bodies similar to themselves, which are in their turn gifted with a

similar procreative faculty. Colloid cancer exemplifies this condition of encasement. See Plate I. Fig. 10. The mode of enlargement here is manifestly *endogenous:* a single cell may be regarded as the *possible embryo of an entire tumor.*

(2.) In other cases the germs of secondary cells are not found within the primary ones. Here, then, the second and subsequent generations of cells must be formed external to preceding ones. This mode of cell-production (which may be termed the *non-endogenous*) is observed in scirrhus, and most commonly in encephaloid.

In the endogenous system of growth, the primary generation of cells *appears* to be all-important, in fact, to involve the subsequent and gradual production of a tumor,—because they contain within them the elements of development *ad infinitum.* But there is another condition necessary, and this is the direct supply of blastema for the nourishment of the rapidly germinating cells. If this supply from the parent organism be cut off, germination must cease, on the axiom *ex nihilo nihil fit.* This is the capital fact lost sight of by those who style cancer a fungus endowed with independent life.

In the non-endogenous mode of growth the secondary and subsequent generations of cells would appear to be beyond the controul of the pre-existing crop: and this is really the case, at first, in some morbid formations; throughout the term of their existence in others. Of the latter, cancer does not afford an illustration; in the peculiar variety of fatty production, which Müller has, under the name of cholesteatoma, made more familiar to pathologists than it had previously been, the evolution of successive layers of cells appears to be effected independently of old ones, and simply, epithelium-like, through the influence of the natural vascularized surface on which the exudation is poured out. In scirrhus, on the contrary, when a certain amount of cells has been converted into the proper substance of the tumor, these cells act on the evolution of new similar ones, as a vascularized surface does on the generation of epithelium-cells: they so influence newly-exuded blastema (of which they constantly excite the accession), that it shall evolve cells similar to themselves. In this system of growth, then, as in the endogenous, pre-existing cells exercise an influence, though a less direct one, upon those which follow. This is the only manner in which I can conceive the perpetuation of identity of cells, and, through this, the similar character of all parts of a mass growing on the non-endogenous plan. But what the

intimate and essential nature of this influence is, appears to me, as a general proposition, undetermined. For though, in cases where free nucleus-like bodies are found in the substance of tumors, those bodies may have escaped from the interior of pre-existing cells, (under which circumstances the influence of old on new cells is clear and intelligible,) such an explanation evidently cannot be accepted as a general one. Whatever be the essence of the influence, it has, I would observe, its limits; this is proved by the formation of products of a different character from itself in the substance of cancer.

These two modes of perpetuation of cells (endogenous and non-endogenous) may prevail in one and the same kind of growth, and even in one and the same specimen. Scirrhus affords an illustration of the fact: here new cells grow both within the old ones (the less common mode of increase in this structure), and outside their walls.

Such is the influence of old cells on the development of young ones: a converse effect is sometimes produced by the latter on the former, the formation of new leading to the ultimate destruction of the original cells. In cancers growing on the non-endogenous plan, the old cells (which never increase very materially in size) appear to crumble away in proportion as the new multiply. This is the case, too, in some instances in the endogenous class. In these latter growths, however, it is usual to find that, coevally with the germination of young cells, the original containing one increases in diameter to a very considerable amount (sometimes even reaching a diameter of two or three lines) without undergoing rupture or destruction; the young cells cohere among themselves, and also to the inner surface of the original cell. Such, at least, would appear to be the views warranted by Müller's observations, and by what I have myself seen; but it must be confessed they have not yet received the stamp of certainty.

§ IV. It is not without interest to inquire here whether the mode of evolution and increase of the ultimate elements of cancer (as of other morbid growths) exercises any influence on structural characters visible to the naked eye. The question may be answered in the affirmative. The locular aspect, both in its spherical and other varieties, as already described (p. 13), I believe to be as simply and readily explicable by a reference to such influence, as it is to me inexplicable on the theories of Dr. Hodgkin (pp. 39, 66) and M. Cruveilhier (pp. 42, 66).

For, first; in growths enlarging on the endogenous plan, it is

obvious that the juxta-position of successive round cells within a containing cell must cause this (independently of any natural inherent tendency on its own part to do so) to retain its spherical outline, until it has enlarged sufficiently to become visible with the naked eye; and further, it is plain, that if several of these enlarged cells be placed round a common centre, and beside each other, the general form of the space containing them must be spherical. And so precisely it is in the distinctly endogenous species of cancer, colloid, that sphericity of the loculi is most distinctly marked. The thickening of the cell-walls and the fibrous deposition, which takes place in the inter-cell-substance, contribute further to the deceptive appearance of encysted structure.

Secondly; in scirrhus and in many specimens of encephaloid, especially the fasciculate variety (masses which do not enlarge on the endogenous plan), the loculi are non-spherical; the predominance of straightly-fibrous arrangement of the stroma accounts for this. But even in growths of this class the original rounded form of the elementary constituents tends to impress upon their larger divisions, as these do upon the entire mass, the spherical shape; accidental circumstances are of course liable to affect it.

§ V. The locular arrangement, be it of spherical character or not, of cancerous growths, gives these productions the appearance of being composed of a containing and a contained matter (p. 13); the latter is by all persons esteemed of new formation, but authors differ in their opinion concerning the adventitious nature of the former. While some maintain that the "septa" of carcinoma are formed of the natural cellular tissue of the part in a state of hypertrophy and induration, the majority of writers consider it a new formation, as proper to carcinoma as the contained matter. Dr. Carswell remarks in confutation of the former opinion, that cellular membrane in a state of acknowledged hypertrophy (such as is met with in elephantiasis Arabum) has no tendency to terminate in cancer; nor does hypertrophy of the heart from disease, or of the muscles from laborious exercise, ever present any other change (except slight increase of consistence) than that implied by this term: besides, carcinoma appears in situations where cellular tissue is either very scanty or altogether absent. According to Dr. Hodgkin, the septa are "neither the dilated terminations of the extreme branches of any of the three vascular systems, nor modifications of the cells of the cellular membrane," but the walls of newly-formed cysts, as already explained. Cruveilhier believes them composed of the parietes of distended veins; any difficulty

attending this notion being got over by the hypothesis " that the existence of a natural venous plexus wherever a normal secretion is accomplished, and of an adventitious venous plexus wherever an adventitious morbid secretion or process is in activity, is a *law* of the economy."

Enough has been already said concerning the opinions of Dr. Hodgkin and M. Cruveilhier to render it unnecessary to consider their claims in reference to the present question.

The fact is, the microscopical history of cancer shows that the proper walls of the loculi (p. 58), or stromal substance, are as much matter of new formation as the contents of these loculi. The argument of Dr. Carswell respecting the absence of cellular membrane in some situations where cancer forms; and the fact, that if the new portion of carcinoma were limited to the contained matter, this morbid structure would hardly present the uniformity of aspect and properties which, with unimportant exceptions, it is observed to possess in every organ and tissue of the economy; corroborate, among conditions observable with the naked eye, the inference which is very plainly deducible from microscopical examination. In the tuberiform variety of the disease, where the original tissues are pushed aside by the growing mass, it is indeed obvious that the total product must be new. And even when the morbid substance infiltrates those tissues, it possesses loculus-walls or stromal basis as purely adventitious as when tuberiform. But under the latter circumstances an appearance of " septa or bands " formed of some of the constituents of the implicated structures is unquestionably to be sometimes noticed. Thus that the so-called " septa" of one variety of mammary scirrhus are formed of the laminar intersections of the gland does not admit of a doubt; but they are these laminæ not merely thickened and indurated, but also infiltrated with cancerous matter: in another variety the lactiferous ducts manifestly form the radiating septa of the growth. Writers have obviously confounded these accidental septa with the true containing element or stroma of cancer.

§ VI. With the growth and enlargement of cancerous masses their *consistence* commonly varies, and the causes of this variation deserve brief consideration.

Laennec, believing he had observed that carcinomatous matter, when first deposited, is invariably firm and hard, and that it subsequently becomes soft and diffluent, as a consequence of its further development, looked upon the degree of consistence of the adventitious growth as a measure of its advancement towards perfect evo-

lution. Hence originated his establishment of two stages of development—those of *crudeness* and of *softening*. But numerous pathologists, who have examined cancer since Laennec's time, have ascertained that its degree of consistence does not by any means furnish a correct estimate of the time elapsed since its formation; that the morbid matter may be extremely soft, nay, diffluent from the first moment it is perceptible by our senses; and hence that such state does not involve as a necessary condition a previous stage of induration. Nevertheless, thus much of Laennec's doctrine seems well founded,—that a tendency to decrease in density, no matter how soft they may have originally been, is an attribute of these products. His error lay in supposing that they must be primitively hard, and that their subsequent semi-liquefaction was a result of healthy development, instead of being, as it really is, evidence of a process of decay,—and in fact the means whereby their inherent tendency to destruction is realised.

The chief circumstances affecting the *density* of carcinoma, while in the healthy state, are the nature of the deposit itself, and the peculiarities of the tissue or organ in which it is developed. If examined under favourable conditions for such investigation, (that is, when their properties cannot be materially or at all influenced by the nature of the part in which they are formed,) manifest proof is obtained that the consistence of cancerous growths may depend on peculiarity of intimate composition. Subcutaneous tumors, for instance, belonging to the same species, exposed to the same extrinsic influences, discovered (and, therefore, the influence is, developed) simultaneously and advancing in growth coevally, occasionally differ extremely in point of consistence; one may possess the firmness of a fibrous growth, another the pulpy softness of semi-putrid brain. Under these circumstances the difference depends on the relative proportions of the contained and the stromal matter; excess of the latter entails a generally indurated state of the mass, because when in excess it has become the seat of fibrous formation. It is also in some measure regulated, as has been already signified, by the amount of non-solidified blastema present. The consistence varies, too, according to the species of cancer. Again, the structure, density, situation and connexions of parts modify this property, as Dr. Carswell has pointed out. "The consistence of the new growth is influenced by its relative quantity to that of the tissues, in which it is contained," [in other words, by the space free for its formation,] "or of a difference in the degree of resistance opposed by the latter to its accumulation or development. Thus it is

more consistent in the liver than in the lungs or brain, in the skin than in the cellular tissue or a mucous membrane." But this doctrine is to be received with much restriction: in the areolar structure of the bones as well as in their medullary cavity, cancerous growths are frequently of cerebriform consistence; schirrus occurs in the brain; and encephaloid of the firmest character in the cellular tissue under the cerebral arachnoid. Besides, growths presenting the opposite extremes of density are often found in close contiguity in the same organ.

The *dimensions* of carcinomatous growths are influenced, and even more distinctly so, by precisely the same circumstances as their consistence. Thus, in respect of the influence of species: scirrhous formations, unless when of the infiltrated kind, reach a moderate size only, whilst encephaloid masses occasionally attain a vast bulk, and colloid productions observe a mean in this respect. Again, while actually contained within the substance of dense parenchymata, even encephaloid rarely exceeds an orange in size; in the lungs and testes it acquires much greater bulk, and in the subcutaneous cellular tissue attains monstrous magnitude. The influence of pressure on enlargement is remarkable; while firmly bound down by fibrous resisting tissues, the development of these masses is obstructed, but, when this obstacle is removed, the immediate result is a sudden and luxuriant increase of bulk. On an obvious inference from this physiological fact has been founded one of the methods (that by compression) of treating carcinoma. In proportion to their perfection of vascularization is the abundance with which blastema is conveyed to their substance; and the facility with which this blastema is evolved and appropriated seems in the direct ratio of its abundance.

The *rapidity of growth* of carcinoma is similarly affected by the same agencies. Encephaloid holds the first rank, colloid the second in point of rapid development. In exemplification of the influence of pressure, it may be observed that an encephaloid tumor, which may have taken months to acquire moderate dimensions, rapidly increases in size when perforation of a compressing tissue opens a free passage for the expansion of the mass. Important illustrations of this fact occur in cases of carcinoma of the meninges, the eye and orbit, &c. Further, idiosyncrasy probably influences the celerity of growth. As specimens of the quick progress occasionally observed, the reader may refer to some cases related by M. Andral:* in one of these, the most satisfactory in its details, an

* Archives Générales de Médecine, tom. ii. p. 209.

encephaloid growth of the greater omentum, rapidly extended from the great curvature of the stomach to the pubis, *daily* acquired an increase in size perceptible both by the eye and hand, and ultimately carried off the patient in less than five weeks from the appearance of the first symptoms. Dr. Carswell and M. Recamier narrate examples of similar progress occurring in the lungs and uterus; and I shall further on relate a case, in which equally rapid growth in the extremities was observed by myself.* On the other hand, these growths sometimes scarcely exceed a walnut in size years after their first appearance: a large tumor, described by Gooch,† had gradually increased in bulk for fifty years. Dr. Carswell observes, that the more the varieties of carcinoma resemble the natural tissues of the body,—that is, the more abundantly they are supplied with cellular and fibrous membrane,—the less rapid, *cæteris paribus*, is their development.

The *shape* of carcinomatous growths, though in some instances and under certain circumstances influenced, as Dr. Carswell has particularly shown, by extrinsic conditions, seems to me to depend mainly upon the uniformity or inequality of its internal development. Circumstances, independent of the tumor itself, however, modify this process: thus, when deposited in a situation where it undergoes equal pressure on all sides, the matter assumes a globular shape; when placed in circumstances which facilitate its lateral and obstruct its peripheric development, it acquires a fungiform figure, as is observed where the matter escapes from a dense into a soft tissue, or through an ulceration in the skin. When formed in the subserous cellular membrane, it exhibits itself in layers (*stratiform* cancer, Carswell) of various extent and indefinite arrangement. It frequently appears in the form of small circular patches, varying in size from that of a pin's head to an inch or more in diameter, is in this state of a creamy consistence, and most commonly met with under the pia mater and pleura pulmonalis. *Ramiform* is the term used by Dr. Carswell to denote the arrangement of the adventitious matter in the veins, lymphatics, and lacteals.

* See Part I. Chapter V. Section IV.

† Cases and Remarks, p. 165. 1758. The encephaloid nature of this growth cannot, however, be regarded as perfectly certain.

SECTION III.

DECAY.

In the two foregoing sections the more important phenomena occurring in, and having no direct influence on the destruction and detachment of cancerous formations have been successively reviewed. Sooner or later a tendency to decay, which seems an inherent quality of structures belonging to this genus, breaks into action; and a series of processes, terminating eventually in more or less complete elimination of the morbid mass, ensues. These processes may, in the most concise and general terms, be said to consist in reduction of the tumor, partially or generally, into a pulpy matter, and the formation of an opening in the investing natural tissues. In order to complete the anatomical or physical description of cancer, it will be necessary here to state the appearances exhibited by each species when in the softened condition; having done this, I shall inquire into the manner in which the decay is effected.

§ I. (*a.*) Softened encephaloid is a dead-white opaque matter of creamy or milky look,* almost completely free from viscidity, and varying in consistence between that of soft cheese and of thin pus.

Before this general softening has become established, the state of progress towards the change may be ascertained by the abundance of milky opaque fluid furnished by gentle pressure.

Opaque points, either irregularly scattered through the mass, or arranged in the form of rude figures, sometimes exhibit themselves: this is the condition described by Müller as a special variety of cancer,—carcinoma reticulare. (See pp. 24 and 59.) The colour of these spots is yellowish-white; the consistence that of pus slightly inspissated. This mode of softening is less common in encephaloid than in scirrhous cancers.

In the immediate neighbourhood, almost in the very substance even, of softened structure, vessels are sometimes visible in unusual abundance. They resist the destructive process more effectually than the cancerous structure; and besides it is possible, as has been suggested by different persons, that the excess of vascular appearances results from the influence of the softening matter in irritating and inflaming the strata adjoining those actually reduced to pulpy detritus.

* This peculiarity of appearance led Professor Ritgen to adopt the term "Galactomyces" for this disease.—(Gräfe und Walther's Journal, Bd. xi. S. 33. 1828.)

(*b.*) The appearances exhibited by softening scirrhus I have already fully described (p. 24) in one of their most common forms; and also (p. 20) referred to the erroneous opinion that scirrhus softens into a material having the appearance of apple-juice. In some cases general infiltration with creamy fluid, as in the case of encephaloid, effects the conversion of the mass into pulp.

(*c.*) The jelly-like contents of the loculi of colloid cancer possess, as far as my experience goes, the same degree of softness at every period of their existence. (See p. 26.) The softening and breaking down of a colloid mass must consequently depend upon the occurrence of these changes in the containing stroma, and the consequent rupture of the loculi and escape of their contents.

§ II. Different notions have been professed concerning the mode in which the softening of cancer is effected.

Lobstein, insisting on the increased vascularity sometimes observable at the period of softening, ascribes it "to an effort of nature to perfect the organisation of the part." This is a mere crotchet.

Drs. Hodgkin and Carswell regard the change as the result of gangrene, itself produced in a variety of ways. In encephaloid, for example, extreme venous congestion sometimes ends in complete stagnation and local suspension of nutrition; if this state continue, mortification ensues. A similar result follows occasionally from the obliteration of a large venous trunk through pressure, and still more commonly from total obstruction of the veins with carcinoma. The cause of this venous stagnation may also be, according to these authors, very distinctly traced to the unequal growth of some of the minor tumors of which it is composed. The rapid enlargement of one of these interferes by lateral pressure with the circulation in another; an occurrence promoted by the pedunculated form. This form is again conducive to gangrene where tumors, in the manner already referred to, pierce the cutaneous or aponeurotic structures; the edges of the unyielding tissue, which has undergone perforation, exercise forcible constriction on the pedicle of the tumor and interrupt its circulation.

Now, although this theory involves some postulates not easily reconcileable with ascertained facts, and cannot for a moment be admitted as a general one, yet, on the other hand, it seems difficult to reject it altogether, because the causes, to which gangrene is thus traced, unquestionably exist; nor can those causes exist without, as far as experience goes, inducing the effects referred to them. I

formerly thought that the absence of gangrenous odour in softened cancer militated strongly against the admission of this theory; but I have meantime seen sphacelated lung perfectly free from such odour. Besides, cerebral substance in a state of colourless softening is free from gangrenous odour, and is yet unquestionably totally deprived of vitality.

The changes in question are most commonly ascribed to inflammation. Here again is a notion, admissible in explanation of some cases, but not of all. It is admissible, for instance, where the soft cheesy matter composed of compound-granule and pus corpuscles is scattered through a mass. It is admissible again where, as in certain tumors I have examined, pus-corpuscles abound, floating, amid broken-down fibres and cancer-cells, in an excess of serous fluid. Inflammatory softening may occur either in a vascularized or an extra-vascular part of a tumor,—the only difference being that in the latter case (as in that of the natural extra-vascular structures) the exudation-matter enters the part by imbibition, and is unpreceded in that actual part by hyperæmia.

The greater number of compound-granule corpuscles present in softened cancer exhibit precisely the same characters, as when formed in common inflammatory exudation. (See Plate I. Fig. 4, *a. b. c.*) Some of these bodies, however, are smaller than the proper inflammatory corpuscle, and are possibly different in nature, and composed of cancer-granules. The actions of acetic acid are the same upon them all.

But in certain instances, where the softening process has reached its height, no positive evidence of inflammation can be discovered. Such cases are, I believe, only to be explained by considering the change similar in nature to that which has been shown by Mr. Gulliver to occur in fibrin stagnating in the vessels. This mode of softening appears to me the most common, and also the *natural* way in which decay arises. The other causes of the change are strictly accidental and morbid.

Hæmorrhage from rupture of vessels leads very perceptibly to softening of the substance into which the blood is effused; but this is an accidental circumstance, and not directly connected with the general mechanism of the change.

The statements now made refer to scirrhus and encephaloid: the question is a different one in the case of colloid cancer. Cruveilhier conceives that the process of softening and destruction in this structure resembles a gradual wearing out (*usure*), layer by layer, unaccompanied with any manifestation of vital activity; and that,

when perforation is thus accomplished, effusion of the jelly-like matter follows. Müller, on the other hand, supposes, that, when the growth of the sub-cells becomes extremely active, they burst their containing cells. Both opinions seem to have fair foundation in fact. In situations, such as the stomach, where the surface of a colloid growth is exposed to injury from the movements of the organ and of the ingesta, the destructive changes must be accelerated by these accidental circumstances.

The process of softening may commence in any part of a carcinomatous tumor, as well at the periphery as the centre. The notion of the constancy of *central* softening has been shown to be incorrect by careful observation. The change may originate in a single spot, or simultaneously in several.

SECTION IV.

ELIMINATION.

The changes in the surrounding tissues accompanying the softening just described, lead to the elimination of the morbid growth. Inflammation and purulent infiltration are among the most important of these. Sloughing of the investing cellular membrane has, in some instances to be hereafter more fully referred to, completely disconnected cancerous tumors from adjoining parts, and led to their total expulsion. When seated under the skin, cancerous growths either induce ulceration in that membrane, as the result of a languid inflammatory action, or distend it, and successively occasion atrophy from pressure, discoloration, diminution of temperature, of sensibility, and softening. Or, when the affected part becomes atrophous, (as is sometimes the case with the mamma,) irregular retraction and puckering of the skin follow: sulci are thus formed; their bases become abraded, and constitute fissures, which gradually spread into ulcers. In any of these cases the skin may itself become cancerous. Perforation thus established, removal of the cancerous matter follows, either in the form of a liquid ichor, or in masses. The latter mode of separation occurs not uncommonly in encephaloid, and leads sometimes, with extraordinary rapidity, to the formation of vast excavations,—excavations which have been seen sufficiently large to lodge the head of an adult. In the case of this product, there is usually an extreme disproportion between the length of time which precedes, and that which follows ulceration;

while the first may be of years' duration, the latter has frequently lasted but a few weeks, when death carries off the patient. Scirrhous ulcers, on the contrary, advance with comparative slowness, though occasionally proving rapidly fatal.

The appearance of the opening, or *ulcer*, is, at first especially, in a great measure accidental. Its edges are sometimes thin, irregular, level with the surrounding surface, or, it may be, sunken, undermined, and *inverted;* the latter condition amounting, in some cases, to a kind of reflection of the skin on itself. But this aspect usually changes, and the edges become elevated, and turned upwards and outwards, or *everted;* a state which is of sufficiently constant occurrence to have been considered almost characteristic of cancerous ulceration. The surrounding skin acquires a bluish-red or brown tint to a variable extent round the sore; and the excavated surface of the latter presents an irregular series of elevations and depressions, smeared with a thin watery matter, mixed with decomposed blood, or pulpy detritus, or studded with black patches of concrete hardened blood. The surface of a scirrhous ulcer is, however, sometimes dry, and of reddish, greyish, or brownish colour; or, in other instances, covered with a stratum of soft and putrid fleshy substance, varying in thickness, and of the same colour as the surface of the sore. Underneath and beside this layer hard scirrhus is discovered, to be in its turn converted into the detritus described; while the healthy parts, still more deeply-seated, undergo cancerous infiltration. The everted and elevated condition of the edge of carcinomatous ulcers has been thus explained: the cancerous structure underneath the border of the opening in the skin meets with no resistance on the surface next the sore, and, consequently, grows inwards towards the centre of the latter, at the same time sprouting upwards, in which direction also it scarcely encounters any opposition; the natural effect of this on the cutaneous edge of the ulcer is to raise it, and turn it outwards. On the other hand, the central portion of the tumor undergoes pressure from the peripheric portions, and its growth is proportionally obstructed. The absence of eversion is traceable to inactivity of growth of the subjacent cancerous matter. These particulars may be easily ascertained by examining a vertical section of an ulcerated tumor.

Hæmorrhage frequently takes place from the surface of cancerous ulcers. In encephaloid such effusion is sometimes extremely abundant. M. Velpeau relates the case of an individual who lost nine pounds of blood in twelve days from an ulcer of this kind

in the axilla.* Such hæmorrhage is extremely difficult to stop, has a constant tendency to recur, and eventually often proves fatal. In some instances the effusion is attended with a sudden sprouting forth of new growth. Extravasation of blood is less common on scirrhous surfaces, seldom becomes very abundant, and occasionally appears to produce a temporary improvement in the condition of the ulcer. The capillary tubes of the growth are its ordinary source; but it may originate in erosion of the larger vessels, or rupture of the varicose veins communicating with the ulcer.

The liquid ichor, or sanies, which forms the *discharge* from cancerous sores, is thin, acrid, and generally of a dirty green colour, but liable to variation in tint from admixture, in various proportions, with effused blood, or from impregnation with melanic colouring matter, as in a case related by Rouzet. It possesses a peculiar, and almost characteristic fœtor.

I have already (p. 34) spoken of the chemical characters of cancerous discharge.

Microscopically examined, this fluid exhibits the elements of cancer in a state of more or less complete disintegration,—the cells being sometimes reduced to fragments, sometimes retaining their outline perfectly. With these elements are associated oil-globules, crystals, epithelium-scales, pus-corpuscles, blood-corpuscles, and certain elements of the structures (or of the secretions of these) amid which the ulcerating cancer is seated. Cholesteatomatous matter, as has long been known, occasionally forms on the surface of ulcers and sinuses of various kinds; and Müller has found in one instance the peculiar non-nucleated polyedral cells of this variety of fatty product, forming a thick layer of substance like tallow, on the surface of a cancerous ulcer in the mamma. When such a formation exists on the surface, its elements will of course be occasionally found in the discharge.

In warm countries, especially, generation of animalcules of various kinds very frequently takes place in the discharge,—a fact first distinctly noticed, as far as I am aware, by Vacher.† Valentin‡ has noticed various infusoria in this fluid; Wagner§ the colpoda cucullulus in the discharge from a cancer of the lip: I have myself seen vibriones. There is, however, it is scarcely necessary to add, nothing peculiar to cancer in their occurrence; but the fact has doubtless in great measure led to the singular theory, al-

* Rev. Méd. 1825, tom. i.

† Diss. sur le Cancer des Mammelles, p. 81.

‡ Repertorium, 1837, S. 119.

§ Beiträge zur vergleich. Phys. H. ii. S. 42.

ready noticed (p. 36), respecting the production of cancer by insects.

I have not seen, amid the material forming the superficial stratum of cancerous sores, any of the elementary forms of vegetable matter (analogous to the mucor, &c. found on decomposed animal substances) which are to be found sufficiently common on the surface of (for example) tuberculous cavities.* The constant change of discharge probably prevents the development of such parasitical formations; but, if stagnation occur to any extent, there is no *à priori* reason why it should not ensue.

SECTION V.

CICATRIZATION.

Ulceration having once commenced in connexion with cancerous substance, the process so uniformly exhibits a tendency to continue, that such continuance may be regarded as one of its inherent qualities. The manner in which the extension of the ulcer, in respect of surface and depth, is effected, has been stated in a previous page: in some cases it advances so slowly, as to be almost imperceptible.

But, singularly as the fact clashes with the general laws of carcinomatous growths, it is no less true, that these products are not wholly incapable of *cicatrization*. Scirrhous ulcers occasionally assume a healthy vermilion tint, become covered with natural granulations, and actually cicatrize over a greater or less extent of surface. Abernethy relates a case of encephaloid tumor of the groin, in which, after the removal of a "portion of the tumor," the ulcer gradually "lost its inflamed aspect, granulations formed, and a cicatrix took place." M. P. H. Bérard witnessed a similar occurrence; and cerebriform cancer of the limbs and meninges has been known to cicatrize in the same manner, after inopportune incision. I have myself recently seen an ulcerated scirrhus of the breast, in which a process of cicatrization had set up around the edges of the ulcer: the ulceration was of the superficial kind; the disease of the atrophous form. According to Bayle, the majority of scirrhous formations, in which this change is observed, are of a particular structure and character. Pouteau considered them the most intractable of all. Certain it is, that the amendment is in

* See J. H. Bennett, on Parasitic Fungi, in Trans. of Roy. Soc. of Edinb. Vol. xv. Part ii. 1842.

almost every instance delusive and temporary: the curative process ceases, and the disease advances with renewed activity. I shall elsewhere * have occasion to refer to a case, in which cicatrization appears to have been permanently effected.

It is to be understood that these observations refer to citratrization occurring over actual cancerous substance.

SECTION VI.

LOCAL REPRODUCTION.

The final phenomenon to be referred to in the local evolution of cancer is its reproduction; the changes following reproduction are but a repetition of those described as arising in the primary formation. The reappearance of carcinoma in the situation of its previous development, after the spontaneous separation, or artificial removal of a tumor, is, in truth, an infinitely common occurrence. This *local reproduction* is effected under different circumstances. 1. The process of cicatrization may not distinctly commence, or be interrupted at an early stage, and fungating growths spring from some part of the wound. 2. A perfect cicatrix forms, and after a variable lapse of time, a tumor grows in the subjacent tissues, presses on the structure of the newly-formed scar, destroys it, appears externally, and on examination presents the characters of carcinoma. 3. Reproduction may be accomplished in the tissue of the cicatrix itself, by the development of tuberiform, or infiltrated carcinoma.

To whichever species the original growth belong, the secondary formation is ordinarily encephaloid; hence, probably, the observation that consecutive run their course more rapidly than primary tumors. I have not seen, nor met with the description of, any case, in which colloid cancer formed consecutively to the separation of a cancerous growth.

It is probable that in all, certain that in the vast majority of, cases this local regeneration depends upon some of the elements of cancer remaining in the seat of primary formation. This is a point to which I shall hereafter return. But I may here observe, that the reproduction of the disease in its original locality in cases where, be it supposed, every single particle of morbid substance has been removed, can only be understood on the hypothesis that (the diathesis still persisting) the tissues originally affected retain their special attraction for cancerous germina.

* Chapter V. Section V. § I. (6.)

CHAPTER IV.

LOCAL MORBID CHANGES.

The phenomena hitherto described are those of the natural evolution of cancer. Cancerous structures, nourished as the original tissues of the body, are, like them, susceptible of various local morbid changes; and likewise produce certain pathological effects on the surrounding parts. I shall concisely describe these two orders of change,—the former as internal, the latter as external.

SECTION I.

INTERNAL MORBID CHANGES.

(*a.*) Partial or general *congestion*, either arterial or venous, occasionally occurs in cancerous growths: in the former instance resulting from irritation, in the latter from obstruction to the venous circulation. The first consequence of this may be supposed to be a change in the colour of the diseased mass, if it be highly vascularized: in the one case a florid hue becomes manifest; in the other a purple, brown, or black tint. But, chiefly owing to the delicacy of the vessels in the adventitious growth, the trifling support received from the substance in which they ramify, and their imperfect communication with each other, extravasation of blood almost always follows.

(*b.*) *Hæmorrhage*, produced in this manner, may become so profuse as to cause a sudden and visible increase in the size of non-ulcerated tumors. Encephaloid, in which hæmorrhage of this kind has recently occurred, is found infiltrated with the effused fluid, or its structure is broken down and mixed with grumous coagula; the appearances in the one case resembling those of capillary apoplexy, in the other of ordinary cerebral apoplexy. Occasionally the mixture of encephaloid in small proportion with a preponderating quantity of blood produces a kind of pulpy detritus, excellently likened by Andral to the red grumous matter filling the loculi of the spleen, when in a state of general softening. To this category is unquestionably referrible the so-called "erectile tissue filled with

a fluid resembling the lees of wine," observed by Cruveilhier in a case of cancer of the liver. I have seen such appearances not unfrequently in the liver, kidney, and post-peritonæal cellular membrane. The true structure of erectile tissue does not exist even in trace in the vascular rete of such formations.

The changes undergone, subsequently to its extravasation, by blood effused into the substance of cancer, do not very distinctly differ from those witnessed in effusions seated in the natural structures. In the interior of this adventitious product, as in other situations, the escape of blood from its vessels is in many instances very important in its results, and I shall for this reason dwell somewhat upon them.

Blood effused into the interior of a cancerous tumor may be either:

1. Absorbed	completely, or incompletely, with subsequent modification.
or,	
2. Not absorbed, and then it	excites inflammation, &c., remains stationary, or undergoes "transformation."

1. Complete absorption is probably extremely rare, on account of the imperfect nature of the structure into which the blood has been effused: the fact of its occurrence seems, indeed, scarcely susceptible of proof.

Partial absorption acts commonly upon the watery and colouring elements of the blood. The cavity once filled by the effused fluid contracts; this fluid becomes more and more concrete, and is eventually removed, the fibrin alone remaining.

In other and less common cases the fibrin is first removed, the effused blood becomes more and more thin and aqueous, and sometimes spreads by infiltration amid the surrounding textures, whence it is eventually absorbed.

An excavation exists where blood has accumulated; this excavation after a certain lapse of time exhibits distinct walls, invested with a smooth membrane of yellowish colour, and contains some straw-coloured fluid of variable consistence. This is the simple apoplectic cyst. In some cases this cyst is traversed by filaments, enclosing meshes; it may then be called locular. The length of time required for the production of these changes in cancerous hæmorrhage I have not been able to determine; but as even in

the instance of the brain the point is altogether unsettled, the failure is not to be wondered at.

Such, I have the most perfect conviction, is the mode of origin of the cysts which, as I have already said (p. 40) are sometimes found in the interior of cancerous tumors. The final point of similarity, namely, the yellow discoloration of the stratum immediately adjoining the cyst, is in some instances observable.

When the fibrin instead of being absorbed remains permanently, it contracts, grows more and more solid, and may even become impregnated with saline matter, and form those cretaceous and so-called ossiform particles sometimes, but rarely, seen in cancer.

2. When not absorbed, blood in this situation commonly excites inflammation. I cannot say that I have observed a satisfactory specimen, in which the fluid had remained for any length of time totally unchanged.—Whether blood, of which none of the elements have been removed by absorption, is capable of undergoing the transformations referred to, is a question not less difficult in the case of cancer than of the natural structures: the general merits of the question are elsewhere (p. 51) discussed.

When hæmorrhage occurs in a cancerous growth connected with a gland, it is not unusual for some of the effused blood to escape outwards by the excretory ducts of the organ.

(*c.*) *Interstitial effusion of serosity* is described by Béclard as occurring in encephaloid, and is said to give the substance of the growth precisely the aspect of the brain, when in a state of colourless softening. I have not seen this; but the fact is readily intelligible.

(*d.*) *Inflammation* of the proper substance of a cancerous tumor has long been habitually spoken of by writers as an ordinary occurrence. Although formerly led to express doubts of the reality of the occurrence, I have since had reason, as has been already shown in the statements made concerning the inflammatory process as a cause of softening of cancer (p. 73), to change my opinion. I have in fact found the pus and the compound-granule corpuscles (microscopically and micro-chemically proved to be so) in the centre of large omental tumors,—in situations where natural textures must have been (and were actually found by observation to have been) wholly deficient.

It seems possible that pus, produced in circumjacent textures, may find its way by imbibition into the superficial substance of cancerous masses, either tuberous or infiltrated.

(*e.*) *Gangrene.*—I have already (p. 72) spoken of this change in connexion with the subject of softening of cancer.

(*f.*) *Adventitious products* of various kinds occur occasionally in the substance of cancer.

(1.) Microscopical saline crystals have been described as rather frequent elements of cancerous tumors. It has not occurred to me to observe them, except in specimens which had either undergone decomposition, or been kept in alcohol. In the former case they must be regarded as results of putrefaction; in the latter, of the combination of the alcohol with the water naturally holding the saline constituents of the tumor in solution. However, amorphous calcareous matter does sometimes occur in small particles in these growths.

2. *Colouring matters.*—*Melanic* matter (both granular and cellular) deposited in cancer in the punctiform, infiltrated or tuberiform modes, (the two former, especially the first, the most common,) sometimes gives tumors a black tint. And an attempt has been made by various writers, misled by this accidental impregnation, to establish the doctrine that black or bistre-coloured growths (melanosis) constitute a separate class of "malignant" productions: I shall examine this point, when engaged with the subject of the Affinities of Cancer. The pigment-cells are irregularly spherical. In some instances caudate cells contain pigment-granules; but whether such cells are cancer-cells or pigment-cells it is difficult to determine: it is unlikely, on the one hand, that the proper cells of cancer should contain pigment; and, on the other, that pigment-cells should pass into the state of fibre.

A partial or general *yellowish tint* is sometimes produced in carcinoma, either, as in cases referred to by Laennec and Dr. Graves, by impregnation with the colouring matter of the bile; or, as is more usual, and as has been just seen, by the changes undergone in the diseased mass in the vicinity of effused blood, resembling those observed in subcutaneous ecchymosis and cerebral hæmorrhage. Dr. Hodgkin expresses his belief, that the yellow tint occurs in the oldest parts of these growths; a remark which I have not been able to confirm. But there is much justness in the observation, that encephaloid thus discoloured bears some resemblance to tuberculous matter; a similarity which has caused the former to be sometimes mistaken for the latter. In certain cases the origin of the yellow tinge is difficult to specify,—as for instance in the tumor I have described (p. 17) as occurring in the post-peritonæal cellular membrane: possibly the tint depends on some peculiar colouring matter analogous to the kirronosis of Lobstein.

3. *Tuberculous matter.*—The fact just referred to, accounts in my mind for many of the statements to be found in books concerning the combination of cancerous and tuberculous substances. For example, Bayle describes a specimen of pulmonary encephaloid containing *tuberculous matter*, distinguishable from the cancerous texture by its yellow opaque appearance: there were tuberculous cavities in other parts of the affected lung. Admitting, however, that the substance presumed to be tuberculous was really of that nature, and not encephaloid accidentally discoloured (as was clearly the case in some of the instances referred to by M. Cruveilhier), it does not appear from the description whether the centre of the tumor was formed before or after the surrounding carcinoma. Andral speaks of tumors of the liver formed of a combination of encephaloid, scirrhus, and crude tubercle; Cruveilhier has figured a composite growth in connexion with the kidney, formed of a layer of encephaloid investing a large mass of "tuberculous" matter. But such facts (conceding their reality) at the most only prove the occasional association of these morbid products; and I shall elsewhere have occasion to show that their coexistence, even in different parts of the same body, is very rare. I have distinctly found a tuberculous appearance given to certain parts of two encephaloid tumors (University College Hospital) by excessive accumulation of fat in those parts.

4. *Fatty matters.*—Common oil-globules are, it has been seen, of such common occurrence in cancer, that they almost take rank with its essential elements.

Cholesterin, which cannot be viewed in this light, has been pretty frequently found in cancerous masses of various seats. To cholesteatoma (a product closely allied in nature and properties to the last-named variety of fat) I have already referred (p. 76) as a constituent of the discharge of cancer, as forming strata on its ulcerated surface, and (p. 29) as forming pearl-like bodies in the substance of tumors.

5. *Cartilage.*—Rouzet reports a case from Lecomte,* in which cartilaginous productions were found scattered through a scirrhus of the breast in the form of little round masses or acicular bodies; but the true nature of these bodies can scarcely even be guessed at. Valentin † presumed he had discovered cartilage-corpuscles in the discharge from a cancer of the face; but he is now well known to have mistaken for these corpuscles the proper cells of cancer. I

* Journ. de Méd. tom. lxxiii. 1787. † Repertorium, Abtheil. ii. 1837.

have never seen the structure of cartilage within a carcinomatous growth, except at the extremity of the bony aciculæ, which sometimes penetrate cancer springing from osseous structure: under these circumstances the cartilage is to be regarded as the matrix of future bone.

6. *Osseous structure.*—The partial conversion of cancer into *bony matter* is a phenomenon much spoken of by writers. Ossification, commencing with the central portion of scirrhous tumors and spreading thence to their periphery, is said to convert the whole mass of some scirrhi into bone. M. Trousseau states that he has frequently observed this mutation in bitches; and Dr. Hodgkin instances scirrhi of the uterus as being especially prone, in the human subject, to such conversion. The septa and enclosing pseudo-cyst of encephaloid are represented as occasionally undergoing osseous transformation, and M. Cruveilhier speaks of spheroidal ossiform concretions discovered in colloid of the muscular coat of the stomach. But I feel myself justified in affirming, after careful investigation of the point, that, if the bony lamellæ actually continuous with some part of the skeleton, and which form a marked characteristic of certain cancers connected with osseous structure, be excluded from consideration, the phenomenon in question will be found to have been much more written of than observed. Dr. Hodgkin's opinion above stated is easily explained by the fact that he regards the well-known "fibrous tumor" of the uterus as true scirrhus of that organ: and it is incorrect to term the matter developed, even in these cases, bone, of which tissue it does not actually possess the structural or chemical characters. That cretaceous or calcareous matter is occasionally visible in carcinoma is, nevertheless, incontrovertible, and I have already (p. 81) pointed out its probable source.

Dr. Hodgkin considers "osseous" formations comparatively more rare in encephaloid than in scirrhus, and attributes this to the greater vitality of the former. Breschet regards "conversion into bone or cartilage" as affording evidence of excessive activity of nutrition in the transformed part. No proof is adduced in support of either opinion; and, as the facts are more than questionable, their explanation cannot be a matter of much interest.

7. *Parasitic animals* do not occupy cancer as a nidus of development. I find recorded by Wedemeyer a doubtful case of intimate association of cancerous structure and *hydatids*. In the anterior lobe of one hemisphere of the brain of an individual, who had died with cerebral symptoms, this writer found a mass of scirrhous

hardness and fibro-cartilaginous consistence "surrounded with a grey puriform semifluid matter containing some hydatid vesicles."* Unfortunately it does not distinctly appear from the narrative whether this semifluid matter was softened cancer, or cerebral substance infiltrated with pus, or in a state of colourless softening.

8. *Cancer.*—It not unfrequently happens that a tumor possessing the characters of scirrhus in the main, displays in some portion of its substance those of softened encephaloid. This circumstance has been adduced as proving that scirrhus may soften into encephaloid, and hence as an unanswerable argument in favour of the doctrine of the original complete identity of all cancerous structures, as well as the incorrectness of establishing a division into species. But may it not depend on the development of encephaloid as a new product in the scirrhous mass? This is a mere hypothesis, it is true; but one more reconcileable with ascertained facts, than the notion that these structures are primitively identical. It surely will not be contended that an erectile tumor may soften into encephaloid, and that both are identical; yet the latter is frequently found in the former. Colloid structure (as I have repeatedly seen, and as has already [p. 29] been fully shown) may form in a basis of scirrhus; and patches of substance having the density and fibrillar structure of scirrhus are occasionally met with in the interior of a colloid growth. Is it reasonable to suppose that these two structures are capable of hardening and softening into each other? In fact, the thing is impossible, for their ultimate elementary constitution and mode of development differ.

SECTION II.

EXTERNAL MORBID CHANGES.

In certain situations cancerous formations may acquire considerable bulk without *apparently* influencing the substance of the part in which they are formed. This is observed in the lung and in the encephalon, even when no pseudo-cyst intervenes between the adventitious and natural structures; hundreds of tumors are sometimes found in the liver, separated by tissue perfectly natural. This is usually explained by supposing the adjacent structure to be driven aside, in proportion as the morbid matter is deposited; but, if this were the case, indurated condensation would be produced: a

* Rust's Magaz., b. xix. f. 229. 1825.

stratum of tissue of variable thickness is probably removed by absorption.

But while the enlargement of carcinomatous growths proceeds, the circumjacent structures in the great majority of cases undergo some one or more of a variety of changes. These changes are *mechanical* or *vital*.

§ I. *Mechanical.* (*a.*) *Detrusion.*—The simplest effect producible by a cancerous tumor on adjoining textures is their detrusion. This detrusion may be simple, or accompanied with pedunculation, —as when, for example, the morbid substance accumulates under a serous membrane.

(*b.*) *Displacements* of various other kinds may ensue from the presence of a cancerous growth in certain organs. Some illustrations of the fact will be found in the description of Uterine Cancer.

(*c.*) Next in order of importance stands *condensation* of adjacent textures. Pleural encephaloid of such magnitude as nearly to fill one division of the chest and detrude the heart to the opposite side, may not otherwise affect the lung than by compressing it into a small firm mass. This fact is more familiarly exemplified in the condensation of the adjoining cellular substance by subcutaneous tumors. In this way a pseudo-cyst may be produced around the new growth, slight hypertrophy of the cellular membrane occurring at the same time. The formation of this natural barrier between the diseased and healthy structures, more frequently observed in the case of encephaloid than of scirrhus, no doubt helps to defend the tissues from infiltration with the morbid matter. The substance thus cut off, as it were, from surrounding parts, has, besides, less tendency to contract adhesions with them,—a circumstance furnishing one of the diagnostic signs between the two species of cancer mentioned.

(*d.*) *Discoloration* of surrounding parts is sometimes effected obviously by the influence of the new growth in obstructing the local circulation. In other instances it arises in a manner as yet unexplained: thus the fat adjoining carcinoma of the breast assumes a saffron tint. (See p. 82.) In advanced stages of cancer in the same organ, the integuments acquire a dingy green or olive hue, ascribable, it is commonly supposed, to changes in the venous blood. Various alterations of tint follow, too, from excitement in the tegumentary circulation, when the tumor acts as an irritating agent.

(*e.*) *Serous infiltration* is frequently observed round subcutaneous and glandular tumors; and it is said, that, in cases of cancer of the

cylindrical bones, the medulla is not unfrequently saturated with serosity. This state, though mainly produced by the mechanical influence of the growth on the local circulation, may be in some measure vital also.

(*f.*) *Blocking up of cavities* may occur either from the enlargement of cancers springing from the walls of those cavities, or originating outside them. Thus, if developed around the vena porta, they interfere with the circulation in that vessel and induce ascites, &c.; if embracing or pressing on the aorta, they may cause partial or total obstruction of its cavity, as in cases related by Cruveilhier, Velpeau, and Lawrence.* Practically speaking, some of the most serious mischiefs produced by carcinoma are referrible to the present head: the miseries arising from obstruction in the alimentary canal especially will hereafter require to be minutely dwelt upon.

§ II. *Vital.* (*a.*) *Hypertrophy.*—Cancer, when so situated as to oppose the onward movement of the contents of hollow viscera, leads to hypertrophy of the muscular tissue behind the obstruction. Thus, in anal carcinoma the muscular tunic of the rectum undergoes thickening; when the disease is seated at the cardia, the œsophagus is similarly affected. The increased nutrition is however the mere result of the additional muscular power required to overcome the existing mechanical obstacle, and is not a specific effect of carcinoma. Sometimes, on the other hand, cancerous organs undergo hypertrophous enlargement, in consequence obviously of the unusual afflux of fluids produced by the tumor. In these cases the arteries leading to the part may acquire unusual dimensions: Cruveilhier mentions his having seen mere ramusculi (running to a cancer of the breast) which had gradually acquired the calibre of the radial artery: I have seen similar hypertrophy of the spermatic artery in cases of cancer of the testis. Where the veins are considerably dilated (a condition which is excessively common in, but by no means peculiar to, carcinoma), actual hypertrophy of their coats must exist.

(*b.*) *Atrophy.*—In scirrhus of the mamma, as has been observed by Sir C. Bell, Scarpa, and others, the proper tissue of the gland occasionally suffers atrophy; in such manner that a breast, in which a cancerous growth is encased, hardly exceeds, or does not even equal, its healthy fellow in bulk. M. Recamier relates a case in which a diseased breast, although containing a growth measuring

* Med. Chir. Trans. vol. viii. p. 13.

four inches in diameter, was smaller than its healthy fellow. In other cases, on the contrary, the diseased organ undergoes general enlargement; or parts of it may be atrophous and others tumefied, —such combination of the two states producing inequalities and protuberances.

(*c.*) *Perforative absorption.*—The production of this effect by carcinoma is exemplified in the progress of meningeal cancerous growths which, after producing perforation of the cranium, sprout out through the opening.

(*d.*) *Inflammation.*—Hyperæmia, with its train of effects, almost invariably occurs sooner or later in the tissues investing carcinoma: it is either eliminatory, or not, in its results. Of the former kind I have more than once had occasion to speak. Among the less familiarly observed examples of the latter may be mentioned the gelatiniform softening sometimes produced in the cerebral tissue subjacent to meningeal cancer; peritonitis spreading from the seat of superficial carcinoma of the liver, and giving rise to ascites; pleurisy occurring as a consequence of the extension of hepatic cancer to the diaphragm.

Among the effects of this inflammation it is necessary to enumerate softening, induration, ulceration, perforation of hollow organs, and mortification.

(*e.*) *Infiltration with induration-matter.*—Such infiltration, of not uncommon occurrence, increases greatly the density and solidity of the affected textures, and gives these a fibrous aspect. Such was the real condition of things, I make no question, in the cases where Cruveilhier found the hepatic tissue between cancerous tumors converted into so-called "fibrous" structure. In cancer of the breast such infiltration of the adjoining muscles is actually common.

This species of infiltration is among the principal means whereby the *adhesion* of cancer to circumjacent parts is effected; and occurs most readily and early in connexion with scirrhus.

(*f.*) *Extravasation of blood.*—Escape of blood from the vessels of the textures adjoining a cancer is by no means an unusual occurrence, long before the establishment of any ulcerative action. If the extravasation take place in a locality communicating externally, hæmorrhage follows, and may constitute one of the very earliest symptoms of the disease. This fact has been fully ascertained in respect of the pharynx, stomach, uterus, and even of the mamma. In such cases the extravasation must be produced by simple transudation following extreme congestion.

(*g.*) *Cancerous infiltration.*—This is the characteristic and most essential of the changes under consideration. Extension of a cancerous growth to contiguous textures by the process of infiltration occurs in the case of the three species, but not with the same facility and frequency. *Encephaloid* has been by some considered more prone to push aside, than to infiltrate, the adjacent parts: Abernethy considered this a fact of sufficiently constant occurrence and importance to warrant a complete nosological separation of scirrhus and "medullary sarcoma." But it is far from unusual for encephaloid of the cellular membrane of the limbs to spread to the adjoining tissues. Cerebriform growths originating under the peritonæum spread to the bones of the pelvis, and even of the thigh. This progressive destruction even of the hardest tissues was, indeed, by Ruysch esteemed so important, that he named the disease "ossivorous tumor." I have myself observed not a few cases,* in which the infiltration of the muscular structure, consequent on the presence of a tumor in the cellular tissue, was so perfect, that the former seemed formed of fasciculi of encephaloid fibres. Such facts are so common, that it is needless to adduce further illustration. Dr. Hodgkin goes so far as to affirm that encephaloid is more prone than scirrhus to affect the surrounding tissues by infiltration. In this extreme opinion he is, according to my experience, certainly unsupported by facts. In the female breast, for instance, while infiltration of the subjacent muscular and other structures is an invariable occurrence, if the disease be scirrhus, I have seen not a very few cases of advanced encephaloid, where the morbid mass had not spread to those textures.

The extension of *scirrhus* to contiguous textures is a very constant phenomenon; as it spreads, the scirrhous growth loses its circumscribed, rounded, moveable character.—No less frequent is the propagation of *colloid* in this manner.

Mr. Travers and Dr. Hodgkin suppose that the extension of the disease to neighbouring parts is preceded either by absolute inflammation in those parts or by a state of irritation almost amounting to this. No proofs are adduced in confirmation of this opinion; and it is irreconcileable with facts, which have fallen in numbers under my own observation. I have repeatedly known the disease spread to adjacent parts without the occurrence of the least perceptible anatomical change or functional disturbance indicating inflammation in those parts. And it would be most strange were

* See, for an example, the case related in Part I. Chapter V. Section V.

the truth otherwise; in as much as, were inflammation a necessary antecedent in such cases, we should be obliged to admit that a certain condition is a *sine quâ non* of the propagation of a disease, though it has none other than the merest subsidiary and accidental connexion with its original development. So far from holding the notion here inculcated, I believe that pure inflammation of circumjacent textures, though not actually preventive of, will often materially interfere with the progress of cancerous infiltration.

Once effected, this infiltration may produce special results. Thus, perforation of the hollow viscera consequent on infiltration of their walls is a familiar occurrence. Such destruction of the recto-vaginal and vesico-vaginal septa is among the most deplorable miseries inflicted by the progress of uterine cancer.

The different tissues of the body vary in respect of their power of resisting cancerous infiltration. While the common cellular membrane is specially prone to undergo the process, structures of the fibrous class are equally remarkable for the converse character. Thus, the efficacy of fasciæ and aponeuroses in controlling the extension of the disease is well known; cancerous structure sometimes grows up on both sides of the sclerotica, and leaves the interjacent membrane unaffected; the intervertebral substance exhibits the characters of health, while the bodies of the adjoining vertebræ may have been completely destroyed, &c.

The *arterial tissue* in connexion with carcinoma commonly remains unbroken for a length of time, while the investing textures undergo rapid destruction. But that the arteries are not always spared, appears from their occasionally giving way with dangerous facility, when tied in the immediate neighbourhood of cancerous formations. Not a few cases appear on record of fatal hæmorrhage resulting from extension of the disease to the chief artery of a limb, and hæmatemesis with a similar result has followed erosion of the splenic or coronary arteries in cancer of the stomach, &c.

The *venous tissue* adjoining cancerous growths is sometimes excessively friable, as has been well pointed out by Recamier; when so affected, it is probable that infiltration may be advancing in its substance. Perforation of the walls of veins by processes jutting forwards from tumors, has already been mentioned (p. 46).

The condition of the adjoining *nerves* varies. Their tissue may retain all its natural characteristics; be absorbed from pressure; become cancerous; or the nervous substance may alone be absorbed, while the neurilemma, thickened and indurated, assumes the characters of induration-structure. They have been more com-

monly observed to undergo encephaloid than scirrhous infiltration.

The *excretory ducts* of glands are sometimes stuffed with blood or with cancerous matter: the ureter is thus sometimes found partially or wholly obstructed, and Müller has ascertained the same fact in respect of the lactiferous ducts.

The condition of the *lymphatic system* will be examined elsewhere.

CHAPTER V.

GENERAL PATHOLOGY OF CANCER.

SECTION I.

SYSTEMIC DEVELOPMENT OF CANCER.

The local development of cancer has been fully considered in a previous chapter; I shall in the present place examine the conditions of its original localization, encroachment, and dissemination, —of what may, perhaps, be termed the systemic development of the disease.

§ I. *Comparative proneness of different organs to cancer.*—(*a.*) That some parts of the body are more prone than others to cancerous disease has long been known. But the documents recently published by M. Tanchou* supply the first contribution to a numerical estimate of the relative extent to which different organs suffer. The Mortuary Registers of Paris and two adjacent Arrondissemens furnished, between 1830 and 1840 (both inclusive), 9118 deaths from cancer; in these the disease was seated as follows:

Uterus	2996	Lips	16	Groin	7
Stomach	2303	Vagina	14	Lungs	7
Female Breast	1147	Spleen	13	Colon	7
Liver	578	Anus	13	Head	6
Rectum	221	Œsophagus	13	Heart	6
Abdomen	188	Neck	13	Arm	6
Intestines	146	Cheek	12	Omentum	5
Bladder	72	Nose	11	Prostate	5
Face	71	Mouth	11	Male breast	5
Mesentery	66	Thigh	10	Hand	5
Ovary	64	Penis	10	Forehead	4
Tongue	36	Leg	9	Shoulder	4
Eye	24	Thorax	8	Throat	4
Jaw	24	Axilla	8	Ear	4
Brain	22	Thyroid gland	8	Pharynx	4
Testicles	21	Scrotum	7	Fore-arm	3

* Recherches sur le Traitement Médical des Tumeurs Cancéreuses du Sein, p. 258. 1844.

Kidneys	3	Umbilicus	2	Jejunum	1
Parotid	3	Haunch	2	Ileum	1
Tonsil	3	Skull	1	Female urethra	1
Larynx	3	Cerebellum	1	Perinæum	1
Palate	3	Ethmoid bone	1	Scapula	1
Temple	2	Orbit	1	Os ilei	1
Chin	2	Retina	1	Pelvis	1
Back	2	Mastoid process	1	Sacrum	1
Pancreas	2	Nucha	1	Nates	1
Iliac fossa	2	Sternum	1	Organ not named	829
Cæcum	2	Pleura	1		
Vulva	2	Peritonæum	1		9118

Admitting these numbers to be correct, however, they rather supply an estimate of the frequency with which the disease proves fatal, when developed in certain situations, and when the primary manifestation of the diathesis, than they convey a notion of the disposition to become the seat of cancer, secondary as well as primary, possessed by different textures and organs. Some researches published by MM. Herrick and Popp* are more directly illustrative of the latter points. In sixty-seven persons dying with cancerous disease at Ratisbon, they found one hundred and forty-three cancers distributed in the following manner.

24 in the Liver.
19 „ Stomach.
10 „ Abdominal cellular tissue.
8 „ Abdominal integuments.
24 „ Cellular tissue round vessels of abdomen; Lungs; Ovaries; Rectum. (Each 6.)
15 „ Brain; Mamma; Cellular tissue of chest. (Each 5.)
12 „ Thoracic integuments; Omentum; Cellular membrane of the thigh. (Each 4.)
10 „ Dura mater; Cellular tissue of the neck; Bones of the chest; Spleen; Cæcum. (Each 2.)
21 „ Cranium; Cellular tissue of the Spinal meninges; Thyroid gland; Pericardium; Heart; Hand; Pancreas; Mesentery: Old abdominal exudation; Cellular tissue round kidney; Kidney; Mucous membrane of intestine generally; Ascending colon; Testis; Uterus; Pelvic cellular membrane; Lower extremities; Cellular membrane round femoral vessels; Femoral muscles; Subcutaneous cellular membrane; Thigh-bones. (Each 1.)

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The small scale of these results diminishes their value very materially; and it is obvious that the very low quota supplied by some

* Ueber bösartige Fremdbildungen des menschlichen Körpers. Regensburg, 1841.

organs (as, for instance, the uterus and mamma) can only have arisen from some accidental and local causes. The frequency with which certain organs suffered is to be ascribed to the fact that consecutive as well as primary cancers are included in the number given; thus, in the twenty-four cases of hepatic cancer, the disease was limited to that organ in five instances only.

(*b.*) The *causes* of the special proneness of some organs to the disease, (*e. g.* the uterus, female breast, stomach, liver, rectum, testicle,) have been made the subject of speculation.

Dr. Hodgkin conceives that, in respect of the genital system of the female, the production of the disease is probably favoured by the intermitting and periodical variations to which the functional activity of the organs composing it is liable. But the comparative rarity of carcinoma of the ovaries (bodies not only participating in all the peculiar and sudden changes to which the other female organs are exposed, but, as modern inquiries have demonstrated, playing the main part in the great function of menstruation,) is in itself sufficient to shake this doctrine to its foundation. Besides, alternations of activity, and of total inaction, are still more frequent in the brain than in the uterus; yet the cerebral substance is in infinitely rare instances only (comparatively speaking) visited with carcinomatous disease. According to the same writer, some parts appear to be predisposed to become the seat of cancer, in consequence of their being possessed of a low or imperfect degree of vitality; and the thymus gland, the supra-renal capsules, the mamma, and nævi materni, are adduced as structures illustrating the opinion. I am not acquainted with any facts proving that such predisposition exists on the part of the thymus gland, or renal capsules; and I believe with Rayer, that the disease has not been observed in the latter, unless as a co-existence with nephritic or hepatic carcinoma. The vitality of fibrous tumors falls vastly short of that manifested by adventitious erectile tissue; yet the immunity of the former growths from cancerous infiltration, and, on the other hand, the fact of the not unfrequent development of carcinoma in the latter, are among the best established points in the pathology of those structures. And if low vitality be so favourable a condition for the production of the disease, how comes it that of all the splanchnic viscera the stomach is most frequently carcinomatous? M. Cruveilhier, widely differing from Dr. Hodgkin, affirms that a superabundance of vitality and developmental energy exercises an unequivocal influence on the predisposition to cancerous disease,—an opinion quite as hypothetical as its converse.

M. Tanchou is of opinion that the frequency of cancerous disease in any organ is in the direct ratio of the importance, constancy of excitement, and impressionable nature of that organ. The uterus takes the first place among structures supporting this theory. Granting (and this merely for the sake of argument) that the uterus is the most constantly excited and most readily excitable organ in the female, surely the ovaries cannot hold a much lower rank in the scale; yet, while the uterus furnishes 2996 deaths from cancer in Paris, the ovaries supply but 64! Again, it is fair to calculate that in every instance of excitement in an individual of one sex, a similar condition is engendered in an individual of the other; yet, while the female genital organs supply a quota of 3076 deaths, the male furnish the paltry number of 43! Besides, were M. Tanchou's views correct, prostitutes should be specially prone to the disease. But the very contrary has been proved to be the fact by the investigations of Breschet, Parent-Duchatelet, and other practitioners in various continental towns, where the social arrangements are such as to consign the treatment of these females on a large scale to particular persons.

A very prevalent mode of accounting for the great frequency of the disease in the mamma and testicle, is by referring to their constant exposure to mechanical injury. The theory has spread from the schools to the vulgar, who almost invariably ascribing the affection to a blow, or some other local violence, confirm in their turn the scholastic prejudice. Now, in the majority of cases, where such causation has been voluntarily declared by patients, or forced from them by the speculative pathologist, close sifting of their previous history distinctly proves either that the morbid growth had originated before the receipt of the injury to which it is attributed, and that in truth the only relation between them is that the patient first discovered the diseased induration in looking after the effects of the blow, or that the occurrence of the accident is purely imaginary. I have repeatedly assured myself of this. Besides (among other illustrations), if local injury play so important a part in evolving the disease, is it not fair to infer that carcinoma of the cervix uteri should be materially more frequent in prostitutes than in women of regular life? Yet such, we have just seen, is by no means the fact.

That sex exercises a powerful influence on the point under consideration is obvious. The different proneness of the sexual systems of females and males would suffice to prove this. Again, while 1147 deaths are traced to the female breast, 5 males only were cut off by the disease in the same seat. The urinary organs of

males are, on the contrary, much more liable to the disease than those of females. These differences may be dependent upon the differences of structure of the corresponding organs in the two sexes; but how they are thus dependent, it seems impossible to divine.

The locality of carcinoma is manifestly somewhat under the influence of *age*. Previously to puberty the disease is most common in the general cellular membrane, the eye, the brain,* the lymphatic system;—the uterus, mamma, stomach, liver, and intestines enjoy comparative immunity till the thirtieth year. Exceptions to both rules are no doubt met with. Dr. Carswell is of opinion, that the exceptional occurrence of the disease during infancy or early youth in the latter class of organs depends upon their premature or præter-natural functional excitement; but the validity of the conjecture is seriously impaired by certain of the foregoing observations.

It follows, from what has been said, that the causes of the greater tendency of some, than of other, organs to cancerous disease are open to further investigation,—indeed they may be said to have hitherto received none of a serious and sustained kind.

(*c.*) Particular parts of organs are more liable to be attacked than others. Cancer of the œsophagus is excessively rare in the middle portion of the tube, most common in its upper third; the pyloric end is more commonly affected than the other regions of the stomach; the middle lobes of the brain suffer somewhat more frequently than the anterior and posterior; cancer of the uterus almost invariably originates in the cervix; the glans and prepuce are the chosen seat of cancerous formation in the penis; the cortical substance in the kidney; the cervix in the bladder.

It is a curious fact, that, when one only of double organs is affected, the right suffers more frequently than the left. I have found the right lung to be nearly three times as often the seat of primary cancer as the left; and the left kidney not half so frequently affected as its fellow.

(*d.*) But, in respect of the localization of cancer, the circumstance of the disease being primary or secondary requires special consideration.

The question has arisen, whether any particular organs or tissues are incapable of becoming the primary seat of the disease. Indi-

* Cruveilhier affirms that cancer of the brain is the "apanage of advanced age;" the inaccuracy of the statement will be made manifest in the chapter on Cancer of that organ.

vidual experience can scarcely be expected to furnish a correct answer to a question of the kind. Dr. Carswell has never met with carcinoma of the pancreas, muscular, venous, and arterial tissues, serous, mucous, and fibrous membranes, without the disease having been communicated from a neighbouring organ. Yet, in the first place, I shall have occasion to refer to numerous cases of primary cancer of the pancreas, when describing the disease in that organ. Secondly, though primary affection of the mucous membranes is extremely rare, (the disease originating either in the subjacent cellular tissue, or in the muscular tunic, where such exists,) yet I shall satisfactorily show that, in the instance of the stomach, for example, the morbid action commences occasionally with the mucous tissue. Thirdly, though cancerous tumors of the internal surface of the dura mater ordinarily originate in the cellular tissue between that membrane and the arachnoid, yet most accurate observers have ascertained that the morbid growth may sometimes be distinctly traced to the fibrous substance itself. Cancerous tumors are produced from the periosteum of the cylindrical bones, the latter being themselves perfectly free from disease: and it is an established fact that encephaloid sometimes originates in the interstitial substance of the sclerotic coat, splitting that tunic into two distinct laminæ.

Bayle states that the muscles of locomotion are not observed to be affected with primary cancer, in which respect they differ from those of organic life. The fasciculi of Cruveilhier, however, prove that small cancerous masses may be developed secondarily in the muscles of animal life, without any direct continuity with the original disease; and I have myself seen primary encephaloid infiltration of muscular tissue. The only structures, in which primary cancer has hitherto not been observed, are tendon, ligament, the intervertebral tissue, articular cartilage probably, and, as far as I can ascertain, the spleen. Still more extended observation will probably prove even these textures to be capable of affording a primary nidus to the disease. It had long been a currently received opinion that the affection is always secondary, when occurring in the lymphatic system; that carcinoma is occasionally, however, exclusively developed in those organs, is a fact supported by the testimony of Walther, Wardrop, Travers, Recamier, Carswell, Mayo, Littré, Warren, Jäger, and others. I have myself known the disease limited to the mesenteric glands.

Are there, on the other hand, any structures in which, though they are liable to become the primary seat of the disease, *secondary*

development is not observed to occur? If under the head of secondary development be included that consisting in extension of the disease by continuity of tissue, this query must decidedly be answered in the negative. Nor am I certain that any organ is actually exempt from the chance of secondary affection, as an effect of pre-existing disease in *distant* parts. But I have not met with any example of secondary formation, under such circumstances, in the eye, ear, or penis; and such formation is rare in the testicle, mamma, uterus, tongue, lips, ovaries, prostate gland and entire tract of the alimentary canal. The parenchymatous viscera, the lymphatic and venous systems, the bones and the skin are the chosen seats of secondary development.

But not only do the organs affected differ according as the disease is primary or secondary, but the parts of those organs attacked vary with the same circumstance. And it is a fact of deep significance, that secondary cancer affects a special preference for the peripheric portions of the viscera. This is the case in the lungs; whereas the primary affection commonly occupies their root. Secondary hepatic cancers accumulate more particularly towards the surface; the primary disease occurs irregularly through the organ. Secondary renal cancers are to be found particularly in the superficial cortical strata; they form elsewhere, when primary. I know of no instance of the convolutions of the brain being separately implicated, unless when the disease was secondary.

The contrast holds good in respect of double organs. Double organs are rarely found both affected with primary cancer, and are probably never simultaneously seized with the disease; the latter point is certain in respect of the mammæ, kidneys, ovaries, and lungs. Secondary cancer, on the contrary, almost invariably implicates both, and originates in the two at one and the same time.

(*e.*) The species of the disease also influences the localization of cancer.

(1.) There is scarcely a tissue or organ in the body in which *encephaloid* cancer has not been observed, including in this proposition its development by extension from contiguous parts. Thus it presents in itself the cellular, the mucous, the serous, fibrous, and synovial, the osseous, the nervous, the muscular, the venous, arterial, and lymphatic, the cutaneous, the gingival, the cartilaginous, the fibro-cartilaginous, the spongy-cartilaginous, and the ligamentous tissues. I have never observed this morbid product in tendon or in the intervertebral tissue; but Mr. Travers speaks

of its occurrence in the former structure. M. Littré presumes that the articular cartilages, in consequence of their extra-vascular character, are exempted from the disease: probably he is right in respect of its primary development; but cancerous infiltration and destruction of these cartilages take place in the ordinary way by extension of the disease from adjacent textures. I have not met with any distinct example of primary development in the bursæ.* All the viscera without exception are the observed seats of this species of cancer; and, when carcinoma invades adventitious formations of a different genus, it is generally of this species.

(2.) Scarpa believed that *scirrhus* is never produced primitively in any other situation than the external conglomerate glands, in the skin, and in certain viscera invested by mucous membrane. With the first class of structures he ranks the mamma, the parotid gland, the testicle, the submaxillary, and lachrymal glands; with the second, the œsophagus, the rectum, the vagina, the neck of the uterus, and the larynx. He maintained that scirrhus never occurs primitively in the lymphatic vessels or glands, in the sublingual glands or tonsils, or in such viscera, properly so called, as have not been included in the enumeration just made, although some of them are invested with a mucous membrane. Numerous English authors write, though less definitely, to very much the same effect. Mr. Travers, for example, limits the occurrence of scirrhus "to some or other description of secretory texture."

The error of these notions is now fully recognised. Primary cancerous products, possessing all the character of scirrhus, occur in the bones, voluntary muscles, heart, liver, lungs, brain, penis, &c. In fact, the seat of this species of cancer is scarcely more limited than that of encephaloid. Primary scirrhus is rare in the common cellular membrane.

(3.) *Colloid.*—Much difference of opinion prevails among authors concerning the localization of colloid cancer. I shall first make brief reference to existing statements on the subject.

According to Cruveilhier, colloid is the form of cancer most frequently met with in the diseased condition of the bones termed osteo-sarcoma and spina-ventosa: he has, besides, observed it in the uterus, ovary, at the lower extremity of the rectum, in the cæcum, the small intestine, and the omentum It has, however,

* In the elaborate essay published by Bielkiewicz on the anatomy and pathology of the subcutaneous bursæ, no mention is made of carcinomatous disease of these structures. See L'Expérience, Nos. 108, 113, 115, 1839, for a notice of this author's treatise.

appeared to him (and here his experience coincides with that of other observers) to occur most commonly in the stomach, and, like other cancerous structures, to affect, more particularly, the pyloric region. The specimens of this species of carcinoma which have fallen under the notice of Dr. Hodgkin were all situated in the abdomen, either attached to or seated at no great distance from the alimentary canal, and usually in the neighbourhood of the stomach and rectum. This pathologist, however, further avows that it is not very uncommon in connexion with tendon or bone. MM. P. H. Bérard, Velpeau, and many others state they have observed it in the extremities, and it is said to occur with tolerable frequency in the shoulder and upper part of the arm.

The organs and parts in which I have myself actually seen this species of cancer are the stomach and adjacent glands; the small and large intestine; the omentum and the female breast.— An organ in which I have not seen it, but in which there can be no doubt of its having occurred, from the accuracy of the description, is the spinal marrow. — Organs and structures in which its occurrence is doubtful, are the lung and tendon. — Organs and parts in which other products have obviously been mistaken for colloid cancer, are the bones, the ovaries, the uterus, and the extremities.

Cruveilhier, in associating colloid cancer with osteo-sarcoma, has evidently been deceived by some of its physical similarities to enchondroma. When he speaks of this cancer occurring in the ovary, his observations are to be understood really to refer to compound cystoid formations; and lastly his cases of pultaceous colloid cancer of the uterus appear to me (see p. 29) examples of encephaloid infiltration, in which the locular character is marked with unusual clearness.

Again, I have carefully examined some specimens of the gelatinous-looking masses, which occur with some frequency at the upper part of the arm, and give the part the exact outline of a shoulder of mutton. In no single one of these cases was the structure that of colloid cancer; but either of enchondroma or compound cystoid formations, associated sometimes with fatty matter in considerable quantities.

The different species of cancer affect a special preference for certain localities. Thus encephaloid is (disproportionately to its absolute frequency) more common than either of the other two species in the testicle, lungs, kidneys, spleen, and meninges; scirrhus is specially frequent in the uterus, female breast, stomach,

lower lip, and skin; scirrho-encephaloid is *per eminentiam* the hepatic cancer; while colloid infests the alimentary canal and omentum.

I am unable to assign any even plausible reason for these local predilections; nor does a solution of the difficulty appear to me, in the present state of knowledge, possible. All attempts in this direction, at least, have unquestionably failed. Thus Dr. Hodgkin seeks to account for the frequent occurrence of colloid in the alimentary canal, on the principle that the products of the disturbed nutrition of a particular part are liable to be modified by the structure of the surrounding natural tissues;—the regular production of mucus on the surface of the digestive tube is thus supposed to influence the character of the contained matter of the cancer. But there is no shadow of real resemblance between mucus and the semi-transparent matter of colloid. M. Cruveilhier, on the other hand, ascribes the frequency of this formation in the stomach to the great tendency of that organ to carcinomatous disease in general. This is a less hypothetical mode of accounting for the fact, and evidently better reconcileable with the occurrence of colloid in parts unconnected with the mucous secretions; but it leaves unexplained the circumstances that colloid is infinitely rare in the breast, and appears not to originate in the uterus at all.

§ II. *Number of organs affected in any given case.*—Some facts, observed by myself within the last few years, led me to surmise that accumulation of cancer in various parts and organs of the system of cancerous persons was of less invariable occurrence than is usually imagined. With the view of settling the point, I collected all the cases I could find supplying the details necessary for its elucidation; these amount to but 78. MM. Herrick and Popp (loc. cit.) have examined the same question, with the aid of 67 cases. Both series of results, comprising 145 cases, are as follow:

	Cases of Cancer.	
	Limited to one locality.	Invading two or more localities.
Author	15	63
Herrick and Popp . .	25	42
	40	105

From this it would follow that in about 27·6 per cent. of cases of cancer the disease continues to the end, in respect of its local manifestations, an isolated affection. But the cases collected by

myself, taken separately, supply a much lower per-centage; namely, 10·4. Now it appears that the German observers examined the chest only 64 times, and the head 28 times, in their 67 post-mortem examinations; whereas in the cases I have collected, all these cavities were invariably examined. It must not be forgotten, too, that the endosteal structure of the bones is scarcely ever examined, and yet here latent cancers frequently take up their abode.

The species of the disease is connected in an obvious though inexplicable manner with the multiplication of cancers in different parts of the system. When numerous cancers are present, their structure is almost invariably encephaloid.

Scirrhus, though it does sometimes invade numerous organs, is yet commonly limited to one. As respects colloid, M. Cruveilhier states that it is rare to observe its successive or simultaneous development in a number of organs or parts. Dr. Hodgkin expresses himself nearly in the same tone, but adds, that it does at times invade different localities in the same subject. I have seen it in the stomach, intestines, and omentum of the same individual; but have not known it infest various unconnected organs. I have the same doubts of the really colloid nature of the tumors recently described by Mr. Warren,* as seem to have been entertained by the learned writer himself.

I forgot to note the sex of the individuals in the cases I employed, until it was too late; from the figures of Herrick and Popp multiplication of cancers appears to occur with much greater frequency in females than males, thus:

	Cancer limited to one locality.	Cancer invading two or more localities.
Males	11	15
Females	14	27

The number of parts affected in instances where the disease is not limited to a single site, varies extremely. Two, three, four different organs may be implicated; or a vast number of structures, and in every conceivable variety of combination, are found to be the seats of the disease. I know of no better illustration of the extent to which this dissemination of cancer may be carried, than that furnished by M. Velpeau's *Cas Remarquable*:—In this instance the common cellular membrane, the muscles and bones, the lungs and heart, the tissue between the costal pleura and ribs, the stomach, duodenum, and small intestines, the pancreas, kidneys,

* Medico-Chirurg. Trans. vol. xxvi. 1844.

liver, vena cava, and coats of the gall-bladder, the peritonæum, dura mater, and the thyroid gland, were all in various degrees affected with the disease.

§ III. *Influence of locality on the phenomena of growth, &c.*—It was formerly matter of belief that cancers developed in different localities were essentially different in nature; to such a degree, that productions, which would at once have been pronounced cancerous, had they grown in certain sites, were refused this character, because unprovided with the qualities assumed to belong to cancers springing from the structures they occupied. There are at once accuracy and inaccuracy in this notion. It is true that the nature of the texture in which a *cancerous mass* is developed, affects, in some instances, its growth and composition. Thus, when the adventitious product originates in connexion with bone, it is not unusual to find mamillary, lamellar, or spiculated osteoid processes, projecting from the natural structure into the new formation. These processes may be so extensive and numerous as to form, in appearance, a sort of solid basis for the reception of the cancerous substance. Again, in cancer of the breast, extending to the nipple, the lactiferous ducts are necessarily present in the mass. The proper hepatic cells are found in cancer of the liver; fat abounds in cancer of parts profusely supplied with that substance, &c.

But in all these cases the *cancerous matter* itself is altered neither in nature nor in properties.

§ IV. *Conditions of dissemination of cancer through the system.*—The disease may, as far as regards the actual production of tumor, be confined to a single site from first to last,—no organ, but that originally affected, presenting on post-mortem examination any traces of cancerous formation. It has been shown that the proportion of such cases to the total number is far from being contemptibly small. When, on the other hand, numerous parts are affected, it is conceivable that the dissemination may have occurred by a successive or by a simultaneous process of development. Both these modes require consideration.

I. *Modes of dissemination.*—(A.) *Successive dissemination.*—Here the disease originates in a single organ or tissue, whence it seems to spread, as from a centre, to a multitude of parts; the latter are said to be affected with *secondary* or *consecutive* cancer. Now the mechanism by which the disease is propagated must obviously vary, according as parts adjacent to or distant from the primary growth are the consecutive sufferers.

(*a.*) (1.) Where circumjacent textures are attacked, the propa-

gation is effected by the progressive interstitial deposition (or *infiltration*) of the morbid matter in tissues naturally continuous, or rendered so artificially by the previous formation of adhesions. (2.) I believe, too, with several observers, that parts simply placed in juxta-position or close proximity may without any such pre-establishment of adhesion contaminate each other. As instances of this mode of extension, cases have been referred to by Dr. Hodgkin and others, in which an ovary, the mesentery, or the liver, being the seats of cancerous formation, the parts in contact with those organs, for example the intestine, the walls of the abdomen, the suprarenal capsule or kidney itself, become similarly diseased.

(*b.*) The occurrence of cancerous formation in distant organs, when an effect of pre-existing disease elsewhere, must evidently be explained on a different principle.

(1.) The diseased condition of the *nerves* adjoining cancer, already adverted to, has been cited by Lobstein* as affording proof that the affection may be transmitted to distant organs through the medium of those structures. This hypothesis has not sufficient plausibility to entitle it to serious refutation.

(2.) The agency of the lymphatic system has very different claims to attention. The condition of the portions of this system in immediate communication with a cancerous growth varies. In some cases it is, to all appearance, perfectly natural. In the great majority of instances, some departure from the healthy condition is observable. The glands exhibit some one of the effects of simple irritation or of cancerous infiltration ; or it may be, that, of a mass of glands in connexion with the new formation, those nearest the latter are distinctly carcinomatous, while the more distant are enlarged from irritation, or the seat of purulent accumulation. Under these various circumstances the vessels leading to the glands are either more or less filled with the adventitious matter, or, as is more common, no modification is discernible in their anatomical state. Now, when the tubes are themselves loaded with cancerous substance, and are, for example, traceable so loaded from the diseased organ even to the thoracic duct, (the latter tube has been found to contain the morbid matter by Andral, A. Cooper, Hourmann, and others,) without any evidence existing of the matter being a product from the walls of the tubes themselves, the implication of the lymphatic system is evidently the result of absorption. But when

* Anatomie Pathologique, tom. i. p. 405. 1829.

the glands are cancerous, and the connecting tubes in the natural state, the condition of the former is not thus so satisfactorily explicable. The difficulty may, it is alleged, be obviated by supposing the secondary formation induced by congestion of the glands, itself excited by the irritation attending the progress of the primary growth. It is not easy to understand why the vessels themselves, in closest proximity to the cancer, should not exhibit traces of the disease, were this conjecture well founded: the analogy of common or venereal irritation will not fairly apply here. Maunoir observes, that, in the advanced stage of encephaloid cancer, lymphatic glands, unconnected with the tumor by vessels, sometimes become affected; and Sir A. Cooper and others have seen the axillary glands of the opposite side diseased in cancer of the mamma. In these cases the lymphatic carcinoma must be admitted to occur independently of the existing growths, unless the statement of Scarpa, that the cancerous ichor sometimes passes circuitously along the anastomosing lymphatic vessels be well founded.

If contamination be admitted to arise as a result of absorption in some instances, it would perhaps appear a necessary inference that such contamination must ensue in *all* cases, in as much as the process of nutrition, accomplished in the usual way, is constantly going forward in cancer. Now, as a matter of fact, this contamination does not always follow, yet the difficulty is not insurmountable; in the latter class of cases, the absorption is of a kind which I may for convenience' sake call *unproductive.* It is perfectly assimilable to that which occurs in abscesses, (the pyogenic membrane constantly absorbs and secretes,) wherefrom no pus, possessing its sum of natural properties, finds its way into the circulation; but wherefrom corpuscles in a state of disintegration and alteration are carried into the blood. Such absorbed pus must be esteemed, by means of the changes effected in its physical constitution, divested of pathogenic properties; for the event proves it to be incapable of giving rise to secondary abscesses. On analogy, in nowise strained, I think it may be admitted that disintegration of the elementary particles of cancer is the cause of the occasionally *unproductive* character of the absorption they undergo. In a word, effete cancer is in these instances absorbed. I may anticipate what will be elsewhere said (Chapter VII.) so far as to observe, that herein lies the reason why the absorption of a tumor, effected by artificial means, may constitute the cure of the disease.

(3.) To the occurrence of secondary carcinoma, in localities free

from direct lymphatic communication with the seat of a primary growth, some other clue must be found. Nor is the search a difficult one: there can be no question that, in this class of cases, the venous system acts as an agent of translation of the morbid matter from its primary site. It is true that the actual demonstration of this is yet wanting; it is incontestable that cancerous elements have not been discovered *in transitu* with the blood permeating the space intermediate between primary and secondary formations.* But are we, in the present state of acquirement in micrology, entitled to expect such demonstration? Has it been obtained in respect of pus? and yet the generation of secondary abscesses, in consequence of the entry of purulent fluid into the veins, is a doctrine as firmly established, as though the pus-corpuscle had been caught circulating with the blood. No: though such irrefragable evidence be deficient in the case of cancer as of pus, the admission of the agency contended for cannot on the following grounds be refused.

α. Cancerous matter exists in a multitude of cases in the veins of the diseased part; now this is obviously a most favourable circumstance for its circulation with the returning blood. β. The rapidity of the successive development of the disease in different organs, sometimes observed, seems only producible by the agency of a fluid which, like the blood, pervades them all. γ. The liver and lung, the two organs in which foreign bodies introduced into the circulation are almost invariably observed to stagnate,† are by far the most frequent seat of the secondary development of carcinoma. δ. The parenchymatous viscera and the bones, the precise structures most frequently affected with secondary abscess, are those peculiarly liable to secondary cancer. ε. In respect of both morbid products, the liver and lungs stand at the head of the list for frequency of implication. ζ. Secondary abscesses affect a special preference for the peripheric strata of the viscera; so likewise do secondary cancers. In the instance of the lung, I believe this readily explicable by the fact, that the majority of the ultimate ramifications of the pulmonary artery reach the periphery of the organ before becoming continuous with the capillaries, where stagnation must occur. η. Double organs are very rarely the simultaneous seat of primary abscess; in cases of secondary abscess both invariably suffer: the same propositions hold good of cancer. ϑ. Se-

* See, however, Section II. § II. of this Chapter.

† Sanders, Cruveilhier, Magendie.

condary cancer in the liver and lung occupies the same elementary seat as the pus of secondary abscesses, a fact particularly insisted on by Cruveilhier. The lobules are the obvious seat of both products; and hence arises the similarity of form and outline exhibited by them both in the very early stages of formation. Add to all this the consideration that the generation of secondary, as a consequence of primary cancer, is in many cases otherwise utterly inexplicable; and a mass of argument is obtained, to which little solid objection can be offered.

Objections have, nevertheless, been offered either directly or indirectly; and it appears necessary briefly to consider them.

(α.) A certain class of writers promulgate a doctrine, which, if correct, renders that I have now exposed unnecessary. These writers, in despair of discovering an intelligible explanation of secondary cancerous development, have, like our forefathers in respect of secondary abscesses, contented themselves with the verbal subterfuge, that it is accomplished in virtue of the intimate physiological connexion or *sympathy* subsisting between parts. The mamma and uterus are adduced as organs exemplifying this mode of propagation of the disease. The illustration is singularly infelicitous. Those who have examined the bodies of many individuals dying with uterine cancer, are aware that secondary development in distant parts is, comparatively speaking, one of its rarer concomitants; and that when such development does take place, the mamma is, in the vast majority of cases, spared. In a very considerable number of females, cut off in all the various stages of uterine carcinoma, I have not observed a single instance of similar secondary growth in the mamma. Conversely, the accurate Bayle declares, as the result of his experience, that the uterus is ordinarily perfectly free from organic disease in cases of fatal mammary scirrhus; and this even in women who have, towards the close of life, had an abundant fetid vaginal discharge: the existence of such discharge has probably engendered the error to which I refer. Dr. Blundell, too, mentions* that he has never seen a coincident deposition in the breast and uterus. Again, the prostate gland and penis are closely connected in their physiological relations, yet I have never known both cancerous in the same individual. The brain and stomach are sympathetically related, yet cerebral cancer is not attended by generation of the disease in the stomach. How close is the relationship of the liver and spleen; yet of eleven cases of

* Diseases of Women, p. 161.

cancer of the liver, related by Andral (Clinique Médicale), one only was attended with similar formation in the spleen; though, in almost every instance there were other organs beside the liver affected with the disease. It is a curious fact, too, that in Velpeau's celebrated case, while the liver contained several hundred cancers, and hardly a part of the frame had escaped contamination, the spleen was unaffected. It is true, that, when cancer exists in the spleen, evidence of the disease is commonly to be found in the liver; but in explanation of this it must be recollected, that no matter where the primary disease exists, the liver is the organ most prone to suffer consecutively. Lastly, I have searched in vain for an example of co-existing cancers in the pancreas and salivary glands, yet physiology pronounces those organs to be so intimately connected, as occasionally to prove, in respect of function, succedaneous of each other. These facts suffice to overthrow the doctrine of "sympathy."

(β.) Dr. Carswell, arguing for the fact of cancerous disease of the blood *ab initio*, affirms that the occurrence of absorption is disproved by minute anatomical details. But he gives no information as to the presumed nature of these; and as has already been seen (p. 52), his doctrine of primary cancerous vitiation of the blood is itself untenable.

(γ.) Dr. Hodgkin is persuaded that the consistence of the matter is sufficient evidence "of its not having been transported along the vessels in which it is found," (of course this applies *à fortiori* to secondary tumors in the parenchymata,) and believes its existence in the veins and lymphatics to be the result of "inflammation of the malignant growth, and the natural structures connected with it." The fact of inflammation occurring, as a constant phenomenon, under these circumstances, is totally unestablished; I shall presently recur to the objection founded on the consistence of secondary formations.

(δ.) According to Müller, the presence of cancer in the venous capillaries "appears simply to indicate inflammation of those vessels;" a notion completely overturned by the well-established fact, that the morbid matter is found in perfectly healthy portions of the venous system.

(ε.) The doctrine of venous transmission may be combated on the ground that, if such be the mechanism whereby secondary cancers are evolved, this evolution, instead of being, as it is, merely a very frequent sequence of primary disease, ought to rank among its invariable effects. In other words, the fact that cancerous

disease does in any single instance terminate the existence of individuals without having manifested itself *physically* in a greater number of sites than that in which its original generation occurred, may be urged to be irreconcileable with the doctrine. But it is not so. In the first place, the presence of the morbid substance in the veins has not been proved to be, and is very unlikely to be, a constant condition of its existence in every form of the disease. Secondly, when the minute veins are blocked up, the circulation in the portions of tube immediately in front of the obstruction can only go forward by anastomotic communications. Thirdly, the morbid substance is in many instances completely cut off from the general circulation by fibrinous coagula. Precisely the same difficulty exists in respect of the circulation of pus with the blood, and is removeable in precisely the same manner.

(ζ.) Another objection to this doctrine may appear in the multitude and large size of secondary formations; it is physically impossible, it may be alleged, that these should have been the produce of absorption from a mass, itself smaller than many among them, and which at no period of its growth suffered apparent diminution of bulk. But I do not mean in the remotest degree to contend (and this is the answer to those who object, on the score of its consistence, to the production of secondary carcinoma by a process of absorption) that consecutive formations are composed of the actual substance of the primary mass,—no more than I should be disposed to affirm that the vast accumulations of pus generated in the viscera in certain cases of amputation are composed of fluid originally formed on the surface of the suppurating stump. In both instances the elements only, which give the impulse to local development, are conveyed from the primary seat of formation. In what manner this impulse is given in the instance of pus, the present is not the occasion to discuss; in the case of cancer, the microscopical history of the product shows that the translation and deposition of a few cells or nuclei only from the original nidus might lead to the development of the largest mass.

(η.) There is yet another fact, apparently subversive of the notion of venous transmission. The detritus and ichor of carcinoma have been injected into the veins of animals, but no development of cancerous structure has resulted from the experiment. Granted: but this simply proves—and it does so perhaps as conclusively as any other adducible argument—the absolute necessity of constitutional predisposition for the production of the disease. Unless this condition exist, even the actual elements of cancer only manifest

themselves as simply irritative agents. The perfection of the seed is not enough to secure the development of the plant; the soil, in which it is sown, must be capable of feeding it.

Intimately allied with the present questions, is the subject of the so-called *metastasis* of cancerous tumors,—a doctrine which has on the evidence of certain cases on record met with not a few advocates. The following is an abridged account of one of these, related by Recamier, on the authority of Parent-Duchatelet. A woman, after having for a length of time suffered from a tumor in the breast possessing all the characters of non-ulcerated scirrhus, and presented the symptoms of the cachexia in so marked a manner that Dupuytren not only refused to remove the diseased organ, but dissuaded M. Parent from the use of leeches, was seized with remittent cephalalgia of intolerable violence: at the same time the mammary growth ceased to be painful, and eventually disappeared almost completely. Apoplectic symptoms with hemiplegia supervened, were combated by the ordinary means, and recurred twice before the patient's death, which took place ten weeks after the first apoplectic seizure, and two years after the supervention of the symptoms in the mamma. On post-mortem examination a tumor the size of a nut, and possessing the characters of carcinoma, according to the testimony of Cruveilhier, was discovered floating, as it were, in a quantity of diffluent brain.

Now, of the accuracy of the facts of this case no fair doubt can be raised; but the interpretation given them wears a more questionable form. In truth, that a tumor can have been conveyed in proper person, particle by particle, from the breast to the brain, and remodelled into shape in its new habitat, is beyond the limits of the credible. In such piecemeal migration it is allowable to have no faith. The only feasible explanations of the circumstances are either that the mammary growth was wholly eliminated by absorption and excretion, and that this removal gave an indirect impulse to the development of a pre-existing tumor in the brain; or that in the course of absorption certain elements of the formation in the breast may have been transferred entire to the brain and there germinated into a mass.

(B.) *Simultaneous dissemination.*—But, it may be inquired, what absolute demonstration can be furnished that in all the cases of general dissemination adverted to, the growths hitherto considered to be developed consecutively to another or others, really possess such relation thereto? Is it not quite as likely that, in some instances at least, the presence of cancerous growths in nu-

merous organs may depend on their *simultaneous* development. Unquestionably such is the truth in a greater share of instances than the language of reporters of cases would lead us to suppose. There can be no doubt that internal cancer is frequently described as consecutive to an external one, (especially when the latter has been removed with the knife, and the former has not manifested its existence by symptoms until after the operation,) when no proof of its not having co-originated with it can possibly be adduced. The fact of succession in the development of the local evidences of the disease seems, in the existing state of knowledge, only capable of absolute demonstration (exclusively of cases of extension by contiguity of tissue) under the following circumstances: 1. when the morbid growth occurs in the skin, subcutaneous cellular membrane, or other situations, where its origin and progress may be traced with the eye and hand; 2. when the lymphatic vessels and glands communicating with a diseased mass themselves become affected. While speaking in general terms, I am obliged to exclude the physical conditions of the adventitious matter and the existence of symptoms from consideration, as elements for forming an opinion, although particular instances do arise in which either may be decisive of the question. Thus neither the size, the consistence, nor the number of masses in a given organ, will always throw any material light on the matter; their growth may have been slow or rapid, their consistence may be soft *ab initio;* a number of tumors may be produced within as short a period as a single growth. We obtain no more satisfactory guidance, as an invariable rule, from symptoms; carcinoma may exist for a length of time in the most important organs—witness, the brain, the liver, the lungs—without producing the least functional derangement. Experience even proves that two-thirds of the surface of the stomach may be destroyed by cancerous ulceration without—provided the orifices are left intact—producing any general or local symptoms of sufficient intensity to direct the attention of the patient or his medical attendant to that important viscus.

But although I consider it right to point out clearly the deficiency, except under the circumstances mentioned, of *absolute demonstration* of the phenomena of sequence, I do not believe the validity of the strong body of evidence, reviewed in preceding paragraphs, and justifying in numerous cases the admission of the real existence of those phenomena, in any sort impaired.

II. *Relative tendency of different parts and organs to affect the system secondarily.*—It may be laid down as a principle, to which

there is no exception, that every structure in the body may, when cancerous, prove the source of general contamination; and on the other hand it is equally certain, that there is no site in which cancer may not run its course to the end without being attended with similar formation in distant organs.

In the description of cancer in the various organs (Part II.), the influence of each in the manner now referred to will be examined. Attempts have been made to explain the special tendency exhibited by some organs to affect the system generally. Thus M. Cruveilhier, referring to cancer of the female breast as being thus characterised, conjectures it may depend on the fact that even extensive disorganization of the mamma does not directly produce disturbance of any important function, a circumstance which allows the disease full time and scope for complete evolution. The justness of this suggestion could only be satisfactorily ascertained by comparing the mean duration of cancer of the mamma with that of other organs: these quantities are unfortunately not ascertained with sufficient accuracy for the purpose. But the mean duration of the disease in some organs may be calculated with closeness enough for comparison; and in such cases the hypothesis mentioned is by no means always borne out. Thus encephaloid of the testicle runs a short average course, yet it is almost invariably attended with secondary cancers.

III. *Relative tendency of the three species of cancer to affect the system generally.*—The different species of cancer exhibit unequal proneness to lead to the production of secondary growths. I have no difficulty in assigning colloid the lowest rank in this respect: that scirrhus holds the first would appear to follow from the fact that it is the species of far most frequent occurrence in the mamma. Nevertheless encephaloid tumors, especially when developed in the extremities and testicle, may be said to possess even superior influence. Numerical evidence on this, as on almost every other point in the history of carcinoma, is yet a desideratum. It is assuredly more common to find a number of organs in the same individual affected with encephaloid than with scirrhus (p. 102): but it does not hence follow that the primary disease was of the encephaloid type.

IV. *Order of dissemination.*—The consecutive development of cancers does not arise in organs *widely separated from each other*, according to any assignable rules. I have sought in vain, both in cases falling under my own notice, and in those recorded by others, for any semblance of a principle (beyond the simple one, that

wherever the primary disease be seated, the liver and lungs are the most common secondary sufferers,) regulating the modes of sequence observed: combinations of organs, the most perversely inexplicable, are constantly encountered. And even in respect of the two organs most frequently thus affected, though the liver ordinarily suffers more extensively than the lungs, and though, when the disease exists in both, its development in the former seems almost always (when the point is capable of decision) to have been prior to that in the latter, yet this is by no means invariably observed.

But as might be anticipated *ex naturâ rerum*, (because here the modes of contamination by progressive infiltration, imbibition, and lymphatic absorption, may come in force, as well as that which acts in producing secondary disease of organs widely separated,) parts seated in *the same splanchnic cavity or region of the body* are more commonly affected in the same case, than localities seated in different divisions of the frame.

V.—Secondary carcinoma is, in the majority of cases, of the encephaloid species; scirrhus is, however, far from uncommon; and colloid probably occurs, though I have not yet met with an example of the fact. The disease under these circumstances usually assumes the nodular form, especially in the liver, lungs, and bones. On the subpleural pulmonary surface it frequently manifests itself in the form of flattened cartilaginous-looking patches.

SECTION II.

STATE OF THE SOLIDS AND FLUIDS GENERALLY.

I HAVE already fully described the morbid changes produced by cancers in the structures immediately adjoining them; my present object will be to inquire briefly into the modifications caused in the physical condition of the system generally by the existence of the disease.

§ I. *Solids.*—There is scarcely a form of anatomical change which may not exist in the bodies of persons cut off by cancerous disease. But I have been unable to discover any single morbid state of the solid textures (excluding, of course, all forms and modes of consecutive contamination) that can be considered peculiar to, or even particularly common in, this affection,—in a word, any morbid condition holding the rank of a "secondary lesion." And my investigations have been sufficiently extensive to lead me

to doubt most strongly that any such states will ever be detected; but it would require the sustained clinical labour of years (followed up on the philosophical system applied by M. Louis to the study of phthisis and continued fever) to justify a positive affirmation on the subject.

In protracted cases of the disease the mass of the solids diminishes, independently of any direct influence exercised by the morbid formation, and simply as a consequence of prolonged deficient nourishment, exercise, &c. The diminished quantity and concomitant changes in the blood also have their influence in the same direction. In proof, or rather illustration of these statements, it may be stated that M. Louis ascertained the mean volume of the heart to be less in persons dying from cancer, especially of the stomach and uterus, than in those succumbing under any other disease; and that while the aorta measures 34½ lines (Fr.) in width at the edge of the sigmoid valves in individuals cut off by acute diseases between the ages of thirty and forty, and 32 lines in the victims of phthisis, it only measures 30 lines in carcinomatous patients of the same age.*

In the Second Part of this work will be found concise descriptions of the morbid states met with in persons dying of cancer in various organs.

§ II. *Fluids.*—The history of the changes undergone in disease by the fluids, both essential and contingent, though in comparative infancy, may be considered to be established to a certain extent. I shall bring together here such facts as appear clearly ascertained concerning the alterations of these fluids in cancer.

(A.) *Essential fluids.*—(*a.*) *Blood.*—(1.) The quantity of blood circulating in the cancerous organism gradually decreases; it becomes paler in the advanced stages; and among other physical changes acquires a peculiar clamminess or stickiness,—at least this peculiarity has forced itself upon my attention in a certain number of instances.

The microscopical characters of the blood have been found in the early stages of the disease unaltered.† And even at advanced periods, when softening had already occurred, and the constitution exhibited the usual signs of sympathy, no modification in the physical attributes of the corpuscles, either red or white, has been discovered, though the search has repeatedly been made.

* Recherches sur la Phthisie, 1ère éd. pp. 54, 56. 1825.

† Gluge, Anat. Path. Untersuchungen, S. 136. 1r. Theil. 1838.

Does the blood contain at any stage of the disease microscopical elements of an adventitious character? Numerous observers have failed to discover any such new elements. But M. Andral* affirms he has, in some cases of fully established cancerous cachexia, succeeded in finding pus-corpuscles with their characters distinctly defined.

And, further, the same observer, in a case of cancer of bone and of the anterior mediastinum, detected in blood in the right ventricle (in addition to pus-corpuscles) certain elliptical lamellæ, finely granular on the surface, much larger than that species of corpuscle, and of far more regular outline than mere patches of albumen. In this rude description some of the characters of cancer-cells may be traced; and similar bodies were found in the fluid expressible from the mediastinal growth. This observation can scarcely be considered to have realised the long-nurtured desire of detecting the matter of cancer *in transitu* with the blood (possibly the bodies in question were simply modified forms of fibrin-particles); but it is of sufficient importance to give new stimulus to the inquiry.

(2.) The relative proportion of the main ingredients of the blood alters with the progress of the disease; but does not appear to be affected at the outset. At least such is the result of observations made by M. Andral. The nature of the alteration is that appertaining to hyperinosis,—increase in the proportion of fibrin, decrease in the proportion of red corpuscles. But these changes, especially the former, are not essential to the disease. Hyperinosis only occurs when the cancerous mass has become the seat of inflammation, softening, and destruction: hence, as M. Andral points out, a novel and decisive argument against the doctrine which ascribes the generation of cancer to inflammation,—the crasis of the blood peculiar to inflammation does not exist until irritative action has incidentally arisen in the new growth or adjacent tissues. If the growth interfere by its localization with the functions of any organ influencing the reparation of the blood, the fibrin may be actually diminished below the natural standard. Doubtless the interference with nutrition generally, caused by the existence of cancer, may tend to diminish the proportion of red corpuscles; but marked diminution of them was only noticed where abundant hæmorrhage had occurred.

In a case of cancer of the left lobe of the liver and of the pylorus,

* Hématologie Pathologique, p. 179. 1843.

accompanied with atrophy of the spleen, Simon* found the composition of the blood as follows:

Water	887·2
Solid constituents	112·8
Fibrin	3·0
Albumen	55·1
Blood-corpuscles	45·8
Extractive matter and salts	8·9

The patient was a male, aged fifty-three.

Among the consequences of these alterations of the blood is a tendency to passive serous effusions. In the anasarca attending cancer there is commonly neither albuminuria nor renal disease of any kind present. M. Rayer† refers to two cases wherein chronic albuminous nephritis (Bright's disease) "occurred in the course of cancerous disease of the stomach," but there is no evidence given to prove that the former was an effect of the latter. M. Martin-Solon‡ relates a doubtful case of the same kind.

(*b.*) *Chyle.*—M. Andral (loc. cit.) mentions his having detected some pus-corpuscles in the fluid of the thoracic duct of an individual cut off by softened cancer of the liver. The fluid was of reddish colour, and contained red blood-corpuscles.

Of alteration of the contents of the thoracic duct from the presence of cancerous matter within it, I have already (p. 104) made incidental mention.

(*c.*) *Lymph.*—What changes, if any, are undergone by this fluid, remain to be discovered.

(B.) *Secreted fluids.*—*Urine.*—The urine is the only one among the secreted fluids, which I have examined with any care in cancerous sufferers. The inference to which I have been led is, that, although various alterations of this fluid are met with in such patients, they are rather the effects of co-existing states, or in some measure the result of implication of particular organs, than specially significant of cancerous disease. In the first place, no condition of the urine is absolutely peculiar to persons affected with cancer; I, of course, except cases where actual admixture of carcinomatous detritus with the renal excretion occurs as a consequence of the localization of the morbid product. Secondly, while cancer, wherever it be situated, is attended with symptoms of phlogosis,

* Animal Chemistry, edited by Day, p. 309. Syd. Soc. 1845.

† Maladies des Reins, tom. ii. p. 348. 1840.

‡ De l'Albuminurie, p. 168. 1838.

and febrile action is present, the urine is of the kind termed by M. Becquerel* *febrile;* it is high coloured, contains a deficient proportion of water, and an excess of lithic acid and lithates. Thirdly, when the cachexia is fully established, and the patient has been exhausted by pain, insufficient nourishment and hæmorrhage, the urine acquires the *anæmic* character, as described by M. Becquerel. Fourthly, it has been shown by the same observer, that all serious organic affections of the liver are attended with febrile urine; cancer of this organ obeys the general law: the change does not become established, till an advanced period of the disease.

SECTION III.

SYMPTOMATOLOGY.

§ I. *Prodromata.*—Were it satisfactorily established that the local demonstration of cancerous disease is preceded by a certain order of symptoms, an important step would be made towards ensuring success in its early diagnosis, and hence, it is but reasonable to infer, towards diminishing the fatality of the affection. That some such symptoms exist, it would, as a matter of *à priori* reasoning, appear almost impossible to doubt,—at least it might seem hardly possible to conceive that so important a change as the formation of carcinomatous matter can occur in the organism without being preceded by some species of local or general derangement. Yet experience (while it responds to such anticipations in the majority of instances) shows that in some cases not the slightest appreciable deviation from the ordinary standard of health may precede the growth of a tumor, which, once formed, may destroy life with terrible rapidity. I have even seen cases in which, as far as I could ascertain, the general health had appeared unusually good for a certain period previous to the outbreak of the disease.

The proportion of cases in which prodromata occur, the connexion of certain localizations of the disease with their appearance, the influence of age, sex, the different species of cancer, on their production, and, above all, whether, when they exist, they possess any characteristic qualities or follow any characteristic course, are all points yet to be determined.

§ II. *Symptoms.*—I. *Local symptoms.*—(A.) As carcinoma is a new formation added to the part in which it is developed, it necessarily follows as a general truth, that increase of bulk is produced by its

* Semeiotique des Urines. 1841.

presence; in other words, it gives rise to *tumor*. The existence of such tumor (whether seated in an external part, or in an internal organ) is among the most important *primâ facie* signs of carcinoma.

(*a.*) Understood in the widest acceptation of the term, tumor is consequently, from the very nature of the disease, never absent. Even in cases of scirrhus of the cervix uteri, where the infiltration of a small quantity of the morbid matter may constitute the whole of the disease, an increase of bulk is produced in the affected part. Again, in hollow organs, such as the rectum and œsophagus, where the cancerous matter is commonly infiltrated in the walls of the tube, the term tumor is strictly applicable. The apparent absence of swelling, sometimes met with (in mammary carcinoma for instance), arises, as I have already explained, from the atrophous condition to which the texture of the organ itself is reduced; diligent examination in such cases rarely fails to detect the morbid substance in the form of a superadded tumor, or of a portion of the organ increased in size from infiltration.

(*b.*) The enlargement may be perceptible as soon as formed, but rarely attracts attention until it has acquired the dimensions of a small hazel-nut. I, however, had occasion some years since to examine a minute globular induration of the size of a pea embedded in the superficial layers of the mamma of a female,—a minute nodule, which attaining the bulk of a walnut in the course of a year, was then removed and found to consist of scirrhus: similar facts are noticed in a subsequent page, but they are of much less common occurrence in actual practice, than is very usually taught.

(*c.*) The shape of the tumor is subject to much variety; it may be pedunculated or polypiform, wedge-like, circular with flattening, globular, or amorphous, and may or may not be circumscribed.

(*d.*) The surface is in the outset usually smooth and even, but very generally becomes lobulated or botryoidal as the growth of the mass advances.

(*e.*) The anatomical descriptions of the three species of cancer are sufficiently explanatory of the size which masses composed of each commonly acquire (pp. 15, 22, 28).

(*f.*) The consistence of a scirrhous tumor is usually very considerable; carcinoma of this species, as observed more particularly in the mamma, sometimes possesses the dense, heavy, and unyielding hardness of stone. The characters of encephaloid substance are in this respect peculiar, when it has accumulated extensively; or, in some cases, even from its earliest appearance. Combined with a

moderate degree of softness, a sort of doughiness and elasticity is very distinctly palpable; this character coexisting with hardness and density in other parts of the growth will scarcely leave any doubt as to the nature of the formation presenting it. It has, however, been mistaken for the fluctuation of an abscess, an error productive of most serious mishaps in treatment: a bistoury has more than once been plunged under this false impression into the midst of softened encephaloid masses, given rise to tremendous hæmorrhage, led to the immediate establishment of ulceration, and materially shortened the patient's life. Scirrhus, when softened partially, becomes the seat of pseudo-fluctuation, which is, however, very different from the elastic feel of encephaloid; and the doughy sensation conveyed by a knot of varicose veins lying on the surface of a tumor may, as M. Recamier remarks, be mistaken by an inattentive person for the peculiarity in question. The sensation felt on pressing the softer parts of an encephaloid growth bears most similitude to that produced by an erectile tumor.

As a general fact, which should not be forgotten at the bed-side, the consistence of cancerous growths appears greater while they are *in situ*, than when removed from the body; I have in a previous page (p. 20) insisted upon this truth. But, further than this, a mass, as soft as brain in itself, may by peculiar circumstances be rendered to the feel densely hard and resisting. Accumulations of encephaloid matter within the tunica albuginea testis, distending but not yet having led to perforation of that sac, may present this deceptive character. The explanation of the fact is simple; its importance in diagnosis obvious. Dupuytren states that pressure gives rise in some portions of an encephaloid growth to a sound like that of crumpling parchment. But this is rather a characteristic of enchondromatous tumors, which in Dupuytren's day were not sufficiently distinguished from cancers.

(B.) The vascular character of encephaloid seems to render it an *à priori* probability that under favourable circumstances *pulsation* might be detected in it. The existence of pulsation is in fact one of the signs of meningeal encephaloid growths protruding through the cranium; it is most probable, however, that this is a motion transmitted from the subjacent brain, and not an interstitial pulsation. The pulsation detected in certain cases of intra-thoracic carcinoma, there can be no question, is a communicated impulse and not interstitial. But large tumors in the limbs are occasionally the seat of the latter species of pulsation. Dupuytren, dwelling on the importance of the phenomenon, describes it as being at

first deep-seated, becoming gradually more superficial and distinct, isochronous with the pulse, unattended with rustling murmur, accompanied sometimes in advanced cases with general expansion of the mass, ceasing when the chief artery leading to the part is compressed, and produced by simultaneous dilatation of all the minute arteries of the tumor. The fact that such expansile beating may occur in encephaloid is obviously deeply important in respect of the diagnosis between this affection and aneurism.

(c.) The *shape of organs and parts* in which cancer is developed is greatly altered in some cases. The accumulation of the foreign matter in the liver occasionally enlarges that organ prodigiously, modifying its form proportionally. Cancerous formations in the kidney produce similar effects. Amid the bones of the face and base of the skull they effect frightful changes in the outline of the parts adjoining. But the most important alteration of shape in a practical point of view exhibits itself in hollow organs or canals. The accumulation of cancerous matter in the walls of these parts has the effect of diminishing their calibre, whence arise the most distressing symptoms of the disease in such situations. Thus, in cancer of the rectum, œsophagus, and larynx, obstructed movement of the matters naturally circulating through those ducts—of the fæces, ingesta, and air—is an early consequence of their decreasing diameter. Further, in the effort to remove the accumulation of the contents of the part which occurs above the obstruction, the muscular coat of the diseased tube becomes hypertrophous, while dilatation proportional to the quantity of the stagnating matters is likewise produced.

(D.) Scirrhous formations are not in their early stage endowed with any marked *sensibility;* as a general rule it may, indeed, be affirmed that they are insensible at first, pressure and various manipulations exciting no discomfort. It has, however, been remarked by numerous observers, that pain is very commonly experienced about half an hour after these tumors have been examined, especially if they have been at all roughly handled. When pain is excited immediately after or during pressure, the fact may, according to some writers, be taken as evidence that inflammatory action is going forward. This is a statement which does not stand the test of observation; I have repeatedly noticed the circumstance referred to, in cases where no particle of evidence existed to make the presence of inflammation even probable.

(E.) *Pain* is perhaps the symptom which has, from the earliest recognition of cancerous disease, attracted the greatest share of at-

tention on the part both of patients and observers. Exaggerated notions concerning its frequency and habitual severity have been the natural result.

(*a.*) In respect of the frequency of this symptom I may first repeat the observation made respecting the tenderness of these growths under pressure—pain rarely exists in the incipient stages. The time of its first appearance is not regulated by any fixed rule; nor is it by any means exceedingly uncommon, embracing in this proposition all species of cancer, and all organs and parts internal as well as external, for the disease to originate, advance, and terminate by the death of the patient, without giving rise to appreciable pain. This is an important point, for I have known the carcinomatous nature of tumors resolutely contested on the score of their being unattended with local suffering—tumors indisputably proved to have been cancerous by their ulterior progress. In other cases pain appears to exist from the earliest period of the disease; a third class of sufferers, tortured with it in the outset of the complaint, are released towards the close.

I am unable to give any precise information as to the proportion of cases in which pain continues absent from first to last; I am disposed to believe that in about one-fifth of cases (including all organs and localities) the symptom is completely deficient.

(*b.*) The character of the pain in external cancer, more especially in scirrhus of the breast, (which has commonly served as a type for all general descriptions of the disease,) is usually lancinating. It is compared by the sufferer to the *prodding* of knives, incision with lancets, &c.; and its darting character signified by the expressions, flashes of pain, electric shocks, &c. A Scandinavian Professor assimilates these rapid pangs to "gleams of the Aurora Borealis." But just as of the existence of pain, so, too, has the constancy of this particular character been much exaggerated. In a multitude of instances, even in the mamma, the pain never assumes this form; in others it does so only temporarily; and in certain organs lancinating pain has rarely, if ever, been observed. Besides, growths of innocent nature are sometimes accompanied in the most distinct and well defined manner with suffering of this kind. How common is it nevertheless to hear the "benignant" or "malignant" character of a tumor confidently predicated from the absence or presence of this most equivocal sign! In some instances the pain is of a burning kind, and suffering of this kind may alternate with that of the former description; in others, a dull aching sensation is all that is experienced; some patients complain of distressing

pruritus; a feeling of weight and coldness in the part constitutes the sole local discomfort of others.

(*c.*) Of whatever kind the local suffering is, it is rarely continuous. The progress of some cases is, in this respect, perfectly intermittent,—and the occasional total release from pain has too frequently betrayed both physician and patient into groundless hopes. It is said to be most severely felt at night, wherein it shares a property of almost every description of pain. Jäger states that it is increased by dampness of the weather, and by an electric state of the atmosphere.

(*d.*) The constancy and severity of the pain vary with the species of cancer. Colloid is productive of comparatively little suffering. Encephaloid, though the pain it causes may not be less acute in some cases than that produced by scirrhus, is attended with a less mean amount of agony; I have known encephaloid growths acquire large size in the female breast, and even undergo partial softening, without causing the slightest suffering.

(*e.*) Numerous writers (among them Mr. Travers) conceive the pain to be produced by "inflammatory action" and "ulceration;" others, that the commencement of softening and the invasion of pain are coeval. Neither of these propositions (which possibly mean the same thing) will stand the test of observation, even in respect of external carcinoma; and they are still more decidedly erroneous if applied to that of internal organs. The pain has many of the characters of the neuralgiæ, and to this class I believe it unquestionably belongs.

It may be affirmed that the intensity and constancy of the pain usually give a fair measure of the degree of rapidity with which the disease advances. But exceptions to this rule occur: M. Recamier, for instance, states that he has known extremely painful cancer last eighteen years, while in other cases the affection, though unattended with particular suffering, terminated fatally in a very few months; in the former instances there was no fever, in the latter occasional febrile paroxysms.

(F.) *Hæmorrhage*, which does not ordinarily occur before ulceration has set in, is sometimes one of the earliest effects of the disease. Thus the discharge of a few drops of blood from the nipple in scirrhus of the breast (a tolerably frequent occurrence at some stage or other of the progress of certain forms of the disease) has in some rare instances been the first morbid phenomenon observed. Profuse menorrhagia in many cases precedes all other symptoms of uterine cancer; and in a case of pharyngeal car-

cinoma, which I observed some years past, the patient persisted in affirming that severe hæmorrhage from the throat was the first circumstance that drew his attention to the part. In a similar manner hæmoptysis is frequently the first occurrence announcing tuberculous disorganization of the lungs. But I would not be understood to mean that effusion of blood is really, even in these cases, the very first effect of the adventitious formation; others have probably led the way, but from their trivial character escaped the attention of individuals who are not in the habit of carefully watching the variations of their health: still, admitting this to be the fact, the practical value of hæmorrhage as a diagnostic symptom is by no means lessened.

(G.) *Local dropsical effusions* of various kinds, induced in the modes already concisely explained, form with sufficient frequency to constitute presumptive evidence (taken in connexion of course with other circumstances) of the presence of cancerous disease.

(H.) *Derangements of function* form an important item in the symptomatology of carcinoma, and of course vary with the organ in which, or in the immediate vicinity of which, the morbid matter is developed. They may be included under the heads of irritative and mechanical.

(*a.*) As illustrations of the *irritative* class, I may adduce the vaginal discharge produced by non-ulcerated scirrhus of the uterus; the occurrence of hydrothorax and pleuritis in persons affected with mammary cancer; softening of the cerebral substance produced through the irritation of a tumor; inflammation of the peritonæum caused by ovarian cancer, &c.

(*b.*) In exemplification of the *mechanical* class may be mentioned the occurrence of amaurosis from pressure on the optic nerve; the interruption to vision occasioned by tumors driving the eye from its normal site; obstinate constipation from pressure of enlarged pelvic glands; derangement of local circulation and serous accumulation either in the shut cavities or in the cellular membrane, produced by partial closure of adjacent circulating tubes, arterial, venous, or lymphatic. Other illustrations will be found in Chapter IV.

Such, considered in their most general aspect, are the prominent symptoms of cancerous growths, external or internal, which have not undergone partial destruction and been brought into external communication by a process of ulceration. This process is preceded by changes in their own anatomical state, in their degree of connexion with surrounding parts, and (where the tumor is more

or less superficially placed) in the appearance of the investing skin. These changes, as well as the particular characters of the ulcer, have already been sufficiently described; the fact of a sanies of fetid odour and peculiarly acrid qualities being more or less abundantly thrown out by the exposed surface has also been dwelt upon at length. The contact of this matter with the cutaneous surface may produce irritation, erythema, and even corrosive ulceration (but, as I shall hereafter show, not actual cancerous destruction) of the parts surrounding the ulcer.

The pain usually increases considerably in violence at this stage of the disease; its character is subject however to vary, as in the earlier periods. The ulcerated surface is frequently quite insensible to the touch. Hæmorrhage now becomes of more constant occurrence, originating in the manner already explained.

II. *General symptoms.*—While the local changes and symptoms advance in connexion with the diseased formation, the constitution almost invariably suffers in a marked and peculiar manner. Certain adventitious products possess the property of disturbing, each after its special mode, the phenomena of circulation, nutrition, and innervation, and of producing thereby a depraved condition of the organism, designated by the general term *cachexia.* The group of symptoms constituting the cancerous variety of this condition, when combined in their most marked and characteristic form, supply very useful information of the nature of the malady. It is not intended, in the enumeration which follows, to display the order of their occurrence; as their mode of connexion and sequence varies, I may almost say, infinitely, I have thought it better to group them according to the functional system affected.

(*a.*) Febrile action of low type exists in the majority of cases, probably in about three-fourths of the total number. Fits of shivering, followed by heat and perspiration, occur in some instances,—they rarely constitute a well-defined paroxysm, and do not recur at fixed intervals. The pulse varies in character in different cases, but commonly (unless the patient have been debilitated by frequent hæmorrhages) long retains a somewhat wiry resisting character.

Febrile action is more common and severe in cases which run their course rapidly, than in those of tedious progress.

(*b.*) It is unnecessary to dwell here on the nature and extent of the changes already referred to (p. 114), in the constitution of the blood. I refer to the point for the purpose of observing, that in proportion as the anæmic character is established, the arteries become the seat of blowing or whiffing murmur, and the veins of

the continuous, remittent, or intermittent varieties of blowing murmur. Tinnitus aurium accompanies this condition of things.

(*c.*) The appetite gradually fails, the patient eventually acquiring disgust for food of every kind. The small quantity of food swallowed is imperfectly digested, and distressing thirst is very habitually complained of. In a considerable number of cases, and under all conditions of localization of the disease, nausea and vomiting become of frequent occurrence. These symptoms are sometimes explicable by a highly injected or softened state of the mucous membrane of the stomach, and are attended during life with tenderness under pressure in the epigastrium; in other instances, and they are by no means rare, no morbid change is discovered in the stomach, and the symptoms are only referrible to sympathetic disturbance. The female genital organs are those in which cancer appears specially prone to exercise this influence on the gastric functions; abdominal cancers are oftener thus attended than those of the other cavities. The condition of the bowels varies; it is rarely natural. Commonly constipation of an obstinate kind exists; in other instances fits of severe diarrhœa occur from time to time; while both conditions alternately torture a third class of sufferers. The diarrhœa in these cases is most commonly produced by excessive secretion; in some instances by inflammation and softening of the mucous tunic of the large and small intestines: in no instance does it necessarily depend upon ulcerations of that tunic. Patches of white exudation (commonly confounded with aphthæ) occasionally appear towards the close of life on the mucous surface of the mouth,—a phenomenon observed in the majority of lingering chronic diseases attended with marked debility.

(*d.*) The nutritive functions become impaired, the tissues grow soft and flaccid, the patient loses flesh, the fat is completely absorbed, the very skin seems to undergo attenuation, the emaciation proceeding to a state of perfect marasmus, unless when œdema of the cellular membrane interferes with its apparent progress. The skin, and even the mucous membranes, assume a peculiar straw-coloured and waxy appearance, accompanied with a semi-transparent puffiness—one of the most characteristic marks of this form of cachexia, and, when distinctly defined, (according to my experience,) actually peculiar to it. I am not prepared to affirm, however, that a tolerably close similarity does not exist between certain modifications of the chlorotic tint and cancerous discoloration; and indeed for this reason such discoloration has more significance in males than females. But the ages, at which they are

met with, differ; the expression of care and deeply-rooted suffering visible in the cancerous, is deficient in the chlorotic female; the dropsical tendencies of the former do not commonly exhibit themselves in the latter; and if doubt remain in the mind of the observer, (a doubt which can only persist from certain associated circumstances,) the exhibition of iron will soon remove it.

The bones share in the defective and diseased states of nutrition observable in the soft solids. The following forms of morbid condition may be enumerated: 1. Atrophy of the spongy and compact structures from defective nutrition; 2. Excess of saline matter in their composition; 3. Insufficient supply of saline materials, in consequence of which, the bony tissue appears as if it had been macerated in a mineral acid (carnification); 4. Carcinoma of their substance. The first of these forms is singularly rare; Recamier, however, appears to have met with an example of it. Of the third I have neither seen an instance, nor have met with a perfectly authentic description, and insert it rather hesitatingly. In the first three cases, the morbid state is a manifestation of the *cachexia;* in the fourth, an evidence of the *diathesis* having reached the bones. In the first, second, and fourth cases, especially the last, fractures occur with extraordinary facility. In cases of cancerous deposition in the bones, the fracture may either arise from complete transformation of a portion of the cylinder into cancerous matter, or from the pressure of a central growth, causing the absorption of the compact tissue. When the fracture is of the former description, crepitation will either be wholly absent or ill-marked; in the latter case this sign is producible in the ordinary way. When a cancerous patient suffers, more or less constantly, from pain in a particular spot in the course of a bone, the occurrence of such fracture is to be apprehended; but local pain is not a constant forerunner of the accident, nor necessarily followed by it. The pain has been mistaken by patients for rheumatism; and this error has not unfrequently been shared by the medical attendant.* In not a few cases the occurrence of fracture has manifestly hastened the fatal issue of the disease.

(*e.*) Certain writers have described loss of the faculty of smell, imperfect vision, and other morbid conditions of the senses, as appertaining to this form of cachexia: more correct observation has disproved their assertions.

(*f.*) The intellectual faculties lose their clearness towards the

* Salter, in Med. Chir. Trans. vol. xv. p. 186. S. Cooper, in idem, vol. xvii. p. 51.

close; but no actually prominent cerebral symptoms occur, unless the contents of the cranium have become the seat of morbid deposition.

(*g.*) Debility and exhaustion become extreme, and occasionally make such rapid progress as of themselves to threaten the existence of the patient. A state of distressing watchfulness, or of total insomnia, deprives the sufferer of the luxury of even temporary oblivion; while the pinched, contracted features, with their habitual expression of wearing distress, or even of suppressed agony, appeal for a relief which too often is granted but by the grave.

(*h.*) It can scarcely be doubted, that each malady possesses its special mode of influencing the moral and affective faculties; but the subject is one as yet unexplored, except in its relations, perhaps, to hypochondria and diseases of the brain.

Cancerous disease gives a sad and gloomy character to all the ideas; its victims never entertain exaggerated notions of their chances of recovery; and their temper is habitually more or less morose, captious and waspish. Although this mental state be in some cases readily explicable by the constancy and severity of the pain endured, it is by no means invariably so; no more than, conversely, the serenity of temper and unflinching hopefulness of the consumptive patient can be referred to his freedom from bodily suffering. And for the simple reason, that in the former class of patients extreme mental depression may exist, though pain be absent; while even physical torture (as I am in the daily habit of witnessing) will not always succeed in souring the temper or crushing the hopes of the phthisical sufferer. It may be legitimately supposed that there is in both cases some material pathological condition present giving its distinctive tone to the affective and moral faculties; and it may, I think, be reasonably conjectured that this condition will eventually be shown to reside in the blood, —some modification of that fluid affecting in each instance peculiarly (and in harmony with its own peculiar nature) the nerves and cerebral organs.

Such, viewed in its prominent features, may be stated to be the most common type of cancerous cachexia; but perfect uniformity is not to be looked for here, more than in any other combination of pathological actions. Thus fever, as has been seen, may be altogether wanting, or manifest itself simply in acceleration of the pulse and heat of skin occurring after paroxysms of pain of more than ordinary severity. In rare instances, the frequency of the

pulse diminishes with the advancement of the disease. A symptom which, in some patients, acquires such intensity as to divert their attention from the local affection altogether, is pain, either of a fixed or erratic kind, in one or more distant parts of the frame: it usually exists in the course of the more important nerves of the extremities. M. Andral remarks, that in cases of cancer in the brain, the trunk and extremities sometimes become the seat of sensations simulating nervous or rheumatic pains; in other instances the skin is exceedingly sensitive; in yet others deprived of all sensibility. The occurrence of similar suffering, in subjects dying from mammary or uterine cancer, may have sometimes depended on implication of the brain or spinal structures in the disease. Again, emaciation is not of constant occurrence; and even the peculiar straw-coloured tinge of the skin may not exist. The appetite too may be preserved. And, in a word, I have seen women who had already lost the greater part of the neck of the uterus, for example, and in whom the disease was making rapid progress, whose outward aspect was, notwithstanding, that of health and physical ease. But enough of these exceptional conditions.

This class of symptoms appears often to be modified by the *species of cancer*. According to Laennec, fever is absent during the greater part of the course of encephaloid, and in many cases death occurs without any perceptible acceleration of the pulse having ever been noticed. When fever does exist, it appears rather to depend on accidental circumstances than on the mere presence of the morbid structure. Emaciation does not ordinarily come on till the disease has existed for a considerable time, but, once set in, rapidly advances to marasmus. Velpeau's case, already frequently adverted to, proves that the disease may occupy a vast number of organs, and exist for a number of years (six at least), without producing notable loss of flesh or discoloration of the skin. But it must not be forgotten that in other instances, on the contrary, a limited accumulation in a single organ excites the most formidable train of general symptoms; Laennec's statements are, on the whole, certainly exaggerated. Colloid, as Cruveilhier has correctly remarked, is the species of cancer accompanied with the least marked and most tardily developed signs of constitutional suffering; in the majority of cases of cancer of the stomach, he has observed, unattended with local symptoms, the disease was of this kind. This observation is confirmed by the experience of numerous persons; the general symptoms may, as in a case which came under the notice of Pockels, be limited to the peculiar discoloration

of the skin. In respect of the influence of *organs* on the cachexia, the mamma, uterus, and stomach are unquestionably the most commonly attended with its intensest forms: yet, as the statement above made shows, exceptional cases occur in which advanced uterine cancer even scarcely affects the system. Cancer of the abdominal viscera generally, and of the stomach in particular, is more prone, than that of the cranial or thoracic organs, to produce the moral and intellectual depression I have described in a previous page.

It may in general terms be stated that the cachectic symptoms do not make their appearance until an advanced stage of the disease; so general was the belief at one period in the uniform truth of this position, that the prognosis and treatment were in a great measure guided by the absence or presence and the degree of intensity of the cachexia. Here was, however, a serious practical error: for, as the experience of accurate observers has proved; 1. Cancerous growths may, in their earliest stage, even before induration of the lymphatic glands has taken place, produce general functional derangement sufficient to constitute a very severe form of cachexia;* 2. Cases in which the whole anterior surface of one side of the chest, or the vagina and the major portion of the uterus had been destroyed by cancerous ulceration, have been known to be accompanied with comparatively slight general disturbance; 3. Patients have occasionally, as has been observed by numerous practitioners, preserved their appetite and flesh to the last, and been able to attend with more or less closeness to their ordinary business; in other words, the disease has terminated fatally without the establishment of cachectic symptoms.

Almost all writers, who have touched upon the question of the source of the cachectic symptoms, agree in referring it to a modified state of the blood. While some, however, advance the opinion as an hypothesis based on many probabilities, others announce it as an ascertained fact: among the latter is M. Cruveilhier. This pathologist, considering the cancerous cachexia and diathesis as one and the same thing, explains the occurrence of both on the principle of venous transmission of the adventitious matter: hence the existence of either, involves that of the other, constitutional condition. Yet while this is the general doctrine professed by M. Cruveilhier, he in one part of his work† states his belief,

* This fact shows the fallacy of an hypothesis of Velpeau, that the cachexia only occurs in cases of softening of internal or ulceration of external carcinoma.

† Anatomie Pathologique, Livrais. xxv art. Rectum, p. 3.

that the cancerous cachexia depends less on the disease itself than on the hæmorrhages with which it is accompanied. But as hæmorrhage must lead to the evacuation of circulating cancerous matter as well as of circulating blood, these two notions are utterly irreconcileable; the latter, indeed, taken in connexion with the former, if it mean anything, signifies simply that an effect (the cachexia) is increased by the removal of its cause (cancerously diseased blood). It is, however, otherwise certain, that the notion concerning the influence of loss of blood is unfounded; for the cachexia sometimes exists in an intense form where hæmorrhage has never occurred.

Were the general principle, contended for by M. Cruveilhier, just, it would follow that the cancerous cachexia and the cancerous diathesis must be regarded as conditions most intimately allied. Yet that the distinction between the two is not a scholastic refinement, but actually exists broadly defined in nature, is rendered clear even by the examination of the present question. In fact, no regular relation subsists between the intensity of the cachexia and the number of organs secondarily affected. Cancer of the uterus, which habitually gives rise to most intense general reaction, does not in many instances induce extensive secondary formation; nor is it exceedingly rare to find numerous organs affected in persons who have suffered to a slight amount only from cachectic symptoms. The necessary inference from these facts seems to be, that the diathesis and the cachexia are produced in different modes; and, as the very strongest evidence argues in favour of the production of the former by cancerous impregnation of the venous blood, I cannot do otherwise than reject the agency of this in respect of the cachexia. But, on the other hand, the influence of other non-cancerous morbid conditions of the blood in the phenomena in question cannot be fairly questioned; though, until an extended investigation into the condition of that fluid at all periods and under all circumstances of the disease shall have been undertaken, the extent and mode of action of that influence must remain unsolved problems.

§ III. *Intercurrent diseases.*—Affections, especially of the inflammatory class, do not appear to be materially modified in respect of their symptoms and course by the existing cancerous malady unless the cachexia have been established. Under the latter circumstances, inflammations (especially when belonging to an important class, as for instance pneumonia) usually run their fatal course in spite of all treatment. Pleurisy with effusion, or simply hydrothorax, is not a very uncommon attendant on cancer of the breast

In a remarkable case (referred to by Cruveilhier*) wherein pleuritic inflammation occurred, and proved eventually the cause of death, the progress of the cancerous disease was stayed for a time, apparently through the influence of the affection of the pleura. M. Scipion Pinel † mentions a curious case in which the removal of a cancer cured insanity.

SECTION IV.

COURSE.

§ I. Cancer is essentially a disease of *chronic* course; nevertheless the disease occasionally proves fatal, within a period so short as to almost give it the character of an *acute* affection. I am tempted to place on record a case of this description (which fell under my notice ten years ago in the wards of M. Louis), because there can be no shadow of doubt as to the facts of the case, —the disease having been seated externally, and every precaution taken to ensure correct information from the patient and her friends. Death occurred in two months from the outset.

M. D. ætat. 62; cotton-spinner; nervo-sanguineous temperament; spare habit; admitted February 5, 1835. Began to menstruate at ætat. 14½, and ceased at ætat. 47; was regular in point of time from the first; discharge lasted nine days both before and after marriage; leucorrhœa frequently in intervals; uterine hæmorrhage on three occasions about six weeks after confinements; has had eleven children, the first at ætat. 20, the last at ætat. 41; four years after cessation of catamenia had a coloured discharge, which lasted some months. Has habitually enjoyed good health; but of late suffers from dyspnœa, under exertion.

Was seized during the last week of December with pain of numb kind at upper part of left thigh, and not extending to abdomen; fifteen days later, swelling (none had ever existed before, according to her own statement and the testimony of friends,) of the painful part commenced and gradually increased to its present amount, affecting from the first the entire thigh, the leg remaining natural; swelling increased by the erect posture; temperature of this limb higher to the patient's feelings than of the other: she has had neither blow, fall, nor other injury. No rigors or abdominal pain at outset, but much heat of skin and thirst; appetite, completely lost at first, has returned within the last fortnight; neither cough, nausea, nor diarrhœa; urine natural. Has kept bed constantly for last month; insomnia from pain; emaciation (at present extreme) has been gradually increasing from the outset.

Present State. (*Feb.* 6.) (*a.*) Tongue tolerably moist, clean, slightly red at borders; appetite exists decidedly; thirst considerable; no abdominal pain; bowels moved once yesterday; the anterior superior spinous process of *right* ilium promi-

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* Anatomie Pathologique, Livraison xxxi.

† Traité de Pathologie Cérébrale, p. 224. Paris, 1844.

nent, that of the *left* confounded with the flank and thigh; the pelvis appears in clined to the latter side, and here the walls of the abdomen are very œdematous the superficial epigastric veins full and considerably enlarged on both sides,—on th *left* more so than on the *right*, where the vessel contains little blood. When th finger is placed on the *left* vein an inch below umbilicus, the size of the vessel re mains unaltered; if compressed superiorly, it ceases altogether to be apparen Abdomen hard and tense, from muscular contraction; the œdema of its walls ex tends to the *left* loin and posterior part of base of thorax; there are no veins ap parent in these parts. *Left thigh*, at least double the size of right, present anteriorly and internally a multitude of violet-coloured veins. Externally at it middle is a large tumor considerably harder than any other part of the limb, nor pulsatile, elastic, and pitting very slightly on pressure. In every other part of th thigh, except the groin, where too the elasticity just mentioned exists, pressure pro duces a deep and lasting mark; temperature of the limb natural. *Left* leg uni formly œdematous, veins slightly marked. *Right* extremity nothing remarkabl When quiet, she only feels a numbness in the left thigh; turning in bed increase this to an acute pain, which is felt principally towards the great trochanter. (*b* Respiratory murmurs slightly harsh, expiratory slightly prolonged under right cla vicle; percussion under both clavicles less clear than natural, somewhat clear posteriorly at right than left side. Inferiorly at right side some fine mucou rhonchus. (*c.*) Heart's sounds more audible than natural at both sides posteriorly nothing remarkable at præcordial region; no murmur in neck; pulsations of th aorta very distinctly felt above and below umbilicus; in latter place at an inch an a half to *left* of median line; P. 120, regular, small. (*d*) Heat of skin natural. (*e* Pupils equal, a line broad each; organs of sense natural.—(8*th Feb.*) Tongue pe fectly dry; right superficial epigastric vein increased in size: bowels moved thre times.—(16*th Feb.*) Size of thigh unaltered; swollen part much softer; sma veins on surface have disappeared, and the superficial abdominal ones no longe visible; walls of abdomen much more œdematous than hitherto; right inferior ex tremity commences to be œdematous.—(20*th Feb.*) Tongue moist; urine natural bowels confined; œdema of left side softer than it was, both in inferior extremit and abdomen; superficial epigastric vein of that side becomes again apparent, bu only in points of its course; no internal pain in limb; patient feels sense of heat o its surface, which is neither red nor marked with veins; temperature appears natu ral to my hand; no sloughs or tendency to gangrene at sacrum; failure of strengt very marked; P. 112.—(22*nd Feb.*) Œdema of left hand; vein below umbilicu larger than ever; pressure on this vein opposite umbilicus diminishes its calibr slightly beneath; veins of left thigh distinct, none on right. P. 100, very small urine involuntary; bowels confined.—(25*th Feb.*) Tongue dry; five or six involun tary motions; urine involuntary also; P. 124; left fore-arm œdematous; ema ciation greatly increased.—26*th Feb.* Died at 10 A.M.

Sectio Cadaveris (22 hours after death). No cadaveric rigidity; advance marasmus; œdema less than during life, but the anterior and internal part of thig pits on pressure. On left thigh close to fold of groin there are two prominence separated by a depression; the internal and larger is hard close to fold of groin and then becomes soft for the extent of half an inch, and to such a degree that i almost fluctuates; the tension on the external aspect of the thigh still exists, but i not so marked as during life. When the skin is removed, a tumor of whitish-re colour appears connected with the sartorius muscle, the fibres of which ar

in some spots of natural appearance; elsewhere and for some distance along the muscle, its substance appears converted into matter identical with that of the tumor: this exhibits all the characters of encephaloid cancer of variable vascularity and consistence, doughy and elastic in some points, firm in others. The tumor is not adherent to the skin, but sends processes to the deep parts of the thigh. In the substance of the rectus muscle is a small growth, three lines in diameter, generally firmer than the large mass, but in some places stained with blood; behind this muscle the fascia has disappeared to a considerable extent (three inches by three). The entire substance almost of the triceps muscle appears converted into encephaloid structure, the form of the muscular fibres being distinctly retained, and these separated into bundles by tissue of fibrous appearance; the mass measures three inches by six in its bulkiest part. The tumor close to the groin exhibits the hæmatoid character in some places, and fluctuates almost; it plunges down to the obturator membrane; the saphena vein twists round it, and is misshapen and flattened. The morbid substance may be said to occupy the entire upper third of the thigh, with the exception of the adductors and three posterior muscles. *Uterus* small (two inches high, including cervix); no diseased appearance of any kind. *Peritonæum* healthy. *Vena cava inferior* smooth, and otherwise natural on its internal surface; iliac and femoral veins natural on right side; left external iliac, near tumor of groin, becomes yellowish and opaque, the lining membrane easily removable and slightly rugose; at the part thus affected opens a vein obliterated with a simple clot. [It is unnecessary to give in full the details regarding the other organs: suffice it to say that no other cancer existed in any part of the body; that the tissues were generally healthy; the lungs, however, emphysematous somewhat, and congested in different parts; there were also evidences of congestive bronchitis; there were no ulcerations in the small intestines, or tubercles in the lungs.]

§ II. Considered in respect of the progression of symptoms, the usual course of cancer is to advance steadily, slowly, and uniformly. But exceptional cases (too frequently leading to the erroneous opinion that serious organic disease cannot be present) are not very uncommonly met with, wherein all symptoms disappear from time to time—the patient appearing to be restored to almost perfect health. Of this *intermittent* course numerous illustrations will be found in the Second Part of this work.

§ III. Cancer, habitually giving rise to functional disturbance so marked and decisive, occasionally exists for a time, or even runs its fatal course to the end, without inducing obvious local symptoms of any kind: in such cases the course of the disease is said to be *latent*.

Colloid is the species of cancer most commonly exhibiting this mode of progress; the brain, the organ (and here the cancer is commonly of the encephaloid species) in connexion with which it is most commonly observed. The seat of morbid accumulation in certain organs exercises important influence on this point, as will especially be seen in the history of Cancer of the Stomach. Organs

which give rise to marked symptoms when affected primarily, scarcely give evidence of their implication in the disease when suffering secondarily: the lungs, liver, and kidneys exemplify the fact. Aged persons of the male sex are the most common subjects of latent cancer.

SECTION V.

TERMINATIONS.

The observed modes of termination of cancer are: by cure; by the occurrence of such changes as lead to suspension of progress (practically speaking this may be spoken of as a manner of termination); by death.

§ I. *Termination by cure.*—This occurs either spontaneously, or as a result of treatment. In the latter point of view the subject will be elsewhere considered. I shall in the present place speak only of the phenomenon of spontaneous cure; which is effected in either of the following ways.

(1.) *Resolution and absorption.*—One of the most essential attributes of cancerous substance is an unswerving tendency to grow, or at least to sustain itself unimpaired by the influence of surrounding parts; its nature is opposed to resolution. Nevertheless there would be temerity in denying the possible occurrence of this fortunate change. Weller* affirms that he observed a medullary fungus of the eye of an infant which eventually disappeared and was followed by dropsy and atrophy of the bulb. Mr. Traver relates that "the solution of chloride of lime effected the absorption of a large tumor (in the course of some months) regarded by competent authorities as scirrhus, in a lady whose other breast had been extirpated for that disease. Not long after she died of asthma from diseased lungs; the scirrhous tubercle appearing not only in the chest, but in several of the abdominal viscera." Now it is plain that the use of the chloride and the resolution of the tumor cannot be regarded otherwise than as a mere coincidence. Other cases of a similar character might be referred to; but, from the discovery of internal cancerous disease after death, this is more satisfactory than the rest.

(2.) *Metastasis.*—In the above and similar cases it has been presumed that the morbid matter may not have been actually el

* Handb. der Augenheilk. S. 414. Berlin, 1830.

minated from the system, but simply transferred by the absorbent and circulating vessels from one situation to another. I have already (p. 110) related, after Recamier, the most plausible example I have met with of the so-called metastasis of cancerous tumors, and in the same place explained how such facts are to be interpreted.

(3.) *Alteration of structure?*—Researches in comparative pathology have been adduced to show that cancerous masses may become the seat of an altered state of nutrition, leading to a change in their composition tantamount to a cure. The alleged process is perfectly analogous to that by which an innocuous character is conferred on pulmonary tubercle, through the substitution of inorganic for organic materials. Thus M. Trousseau has, as we have seen, frequently traced the conversion of scirrhus into "ossiform matter" in the lower animals. He adds, that in the horse, dog, and cat, he has satisfied himself of the transmutation of encephaloid and scirrhus into encysted masses, containing a homogeneous matter finely granular, varying in colour from a straw-coloured yellow to a rusty red, without vessels, cellular filaments, or the least vital connexion with the inner surface of the cyst. The separation of the "dead matter" from the tissues of the body by a lining cyst protects the latter from the irritative effects which the former might produce. Whether these changes may be really witnessed or not in the lower animals, the latter mode of conversion has not even been alleged to occur in man; and I have already (p. 84) assigned apparently valid reasons for doubting that the human subject is ever the subject of the former.

(4.) *Suppuration.*—M. Lévêque-Lasource* relates the case of a man who had a large scirrhous tumor (removed from the back by Boyer) which illustrates this mode of spontaneous cure. The disease, in truth, returned in its previous site after the operation; Boyer considered the case unfit for renewed employment of the knife; subsequently violent inflammation seized upon the part, an abscess formed, and profuse suppuration, followed by recovery, became established.

(5.) *Mortification.*—In some rare cases a spontaneous sphacelus of the morbid substance and of the surrounding parts has led to the total separation of cancerous growths, and been followed by complete recovery of the patient. Garneri,† Cruveilhier,‡ Everard

* Thèses de Paris, p. 27. 1807.

† Bulletin de la Soc. Méd. d'Emulation. Dec. 1810; Sept. 1811.

‡ Essai sur l'Anat. Pathol. tom. i. p. 127. 1816.

Home, Cline,* Steidele,† Dupuytren,‡ Richerand,§ C. T. Jackson,|| and others, have observed this fortunate accident. In one of Dupuytren's cases the separation was preceded by local emphysema and the general symptoms of gangrene, all of which were relieved by incision of the part, allowing the escape of confined gases. From one to two months appears to be the period within which cicatrization and recovery have occurred under such circumstances Dupuytren considered this mode of separation most likely to take place in cases of "encysted cancer." There is no evidence of such having been the condition of the mass in the cases I have found recorded, and there is consequently reason to believe that the notion was merely speculative. Besides, the expression "encysted" cancer is loose, and may be understood in various ways.—The separation of cancer in the manner now described is not however, as a necessary sequence, followed by recovery: Cruveilhier alludes to a case in which healthy cicatrization set in after the fall of the growth, yet indurated masses soon made their appearance in the cicatrix, and, though these were destroyed with the chloride of zinc, the disease spread to the axilla.

(6.) *Cicatrization after destruction by ulceration.*—Instances have already (p. 77) been referred to, in which temporary cicatrization of cancerous ulcers has occurred; they are not indeed excessively uncommon. But it is infinitely more rare that such cicatrization shall proceed to completion, and a permanent cure result. Of this extraordinary occurrence an example is related by Nicod;¶ and Bayle declares he has seen several such cases. Svendsen** records the case of a man with an encephaloid tumor in the right thigh which ulcerated, became the seat of frequent hæmorrhages, and subsequently diminished in size in such manner that the patient left the hospital as cured.

§ II. *Suspension of progress.*—No fact is better ascertained in the history of phthisis than that in a certain proportion of cases (as yet undetermined), and under circumstances equally unknown, the disease undergoes suspension of progress, of greater or less duration. This change in the usual course of events may take place in any

* Lancet, vol. ii p. 401.
† Journal de Médecine, tom. lxxxii.
‡ Journal Hebdom. t. iv. p. 38. 1829. Gazette des Hop. Nos. 24 et 31. 1831.
§ Nosographie Chirurgicale, tom. i. p. 381, 2e. éd.
|| Mason Warren, American edit. of art. Cancer, p. 147.
¶ Bulletin de la Soc. Méd. d'Emulation, No. i. 1810.
** Acta Soc. Reg. Med. Havniensis, vol. vii p. 100. 1829.

stage, the most advanced as the earliest, of pulmonary consumption. Now in such cases although the affection is, strictly speaking, anything but cured, yet a change is temporarily effected, which, as far as regards symptoms and the patient's feelings, amounts to delivery from his malady. A suspension of this kind occurs also, but more rarely, in cases of cancer; not a few instances are on record where women, affected with scirrhus of the breast in an active state, and even in the ulcerated stage, having refused to submit to the operation proposed to them, the morbid growth has subsequently fallen into a quiescent condition, and the patient's life not been shortened by her disease. It has occurred to me to become acquainted with two cases in which the patients succeeded in concealing for years the existence of cancer (in both instances ulcerated) from their husbands: the husband of one of these persons was a medical practitioner, a sufficient motive for presuming that neither the local suffering nor general disturbance were severe or obvious.

§ III. *Termination by death.*—Considered in its most general aspects, death in cases of cancerous disease is the result of: (*a.*) The constitutional influence of the disease on nutrition and hæmatosis (this may be called the *proper* cancerous death); (*b.*) The direct influence of the local disease in the obstruction of certain functions; (*c.*) Intercurrent diseases, generally of the inflammatory class; (*d.*) Hæmorrhage; (*e.*) Exhaustion from pain and abundant discharge. The tendency to one or other of these modes of death varies with the organ affected, and to some extent with the species of cancer,—facts which will be found fully illustrated in Part II.

SECTION VI.

DURATION.

The duration of cancerous affections varies from a few weeks to a considerable number of years: nay more, ulcerated cancer may, as has been just seen above, exercise no obvious influence in shortening life, and hardly produce more inconvenience than a perpetual issue. The mean duration of the disease, when following the more ordinary course, has never yet been methodically investigated on a large scale. I formerly gave the results deducible in this point of view from 37 cases; this number I have since been enabled to increase to 56. MM. Herrick and Popp (loc. cit.) have published a statement of the duration of the disease in 50 cases, which fell under their own notice. It is to be remembered that only cases

uninterfered with by surgical operation are here taken into consideration; and that from my own estimate cases in which the disease ran a protracted course of thirty or forty years, in the manner above referred to, are purposely excluded. The length of the disease is of course reckoned from the occurrence of the first symptoms or signs; hence the results refer rather (and this is true of all such calculations) to symptomatic than absolute duration: and, under all circumstances, they are to be considered merely approximative.

(*a.*) Thirty-nine of MM. Herrick's and Popp's cases had terminated fatally within two years; their general results are as follow: mean duration = 17·14 months; maximum = 120 months; minimum = 1 month. Of the cases collected by myself: mean duration = 38·15 months; maximum = 96 months; minimum = 2 months. The mean duration of 1172 cases, furnished to M. Leroy d'Etiolles* by various practitioners of France, was 63 months. The three series give a mean duration of 39·43 months.

(*b.*) In respect of the species of cancer, the following are the results; the duration is given in months:

	SCIRRHUS.			ENCEPHALOID.			SCIRRHO-ENCEPHALOID.			COLLOID.		
	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.
Author.	54·00	96·00	6·00	16·18	48·00	2·00	,,	,,	,,	26·25	36·00	17·50
Herrick and Popp.	11·31	48·00	2·00	5·00	24·00	1·00	19·40	120·00	3·00	,,	,,	,,

(*c.*) Sex has probably not much influence on the duration of the disease; for though the mean duration in females was 15·34 months, and in males 20·19 months, in the cases of MM. Herrick and Popp, the excess in the former sex appears to have been accidental; and in M. Leroy's 1172 cases the mean duration in males was 60 months, that in females 66.

(*d.*) In respect of the influence of sex and the species of cancer combined, the following mean results are deducible from the facts published by MM. Herrick and Popp. (1.) *Encephaloid:* mean duration in 7 males = 9·29 months; in 12 females = 8·50 months. (2.) *Scirrhus:* mean duration in 7 males = 18·43 months; in 9 females = 21·77 months. (3.) *Scirrho-Encephaloid:* mean duration in 7 males = 32·86 months; in 8 females = 19·63 months.

* Bulletin de l'Acad. Roy. de Médecine, tom. ix. p. 454. 1843.

(*e.*) The progress of the disease is commonly supposed to be slower in old than young persons; a notion rather confirmed than otherwise by the following view of the results of MM. Herrick and Popp:

Age.	No. of Cases.	Duration in Months.		
		Mean.	Max.	Min.
20 to 30	3	5·00	8·00	3·00
30 — 40	7	9·00	36·00	4·00
40 — 50	8	7·01	24·00	1·00
50 — 60	13	19·69	48·00	2·00
60 — 70	16	20·83	120·00	3·00
70 — 80	3	8·00	12·00	3·00

(*f.*) The influence of localization on duration will appear in various chapters of Part II.

SECTION VII.

FREQUENCY AND MORTALITY.

§ I. The data, supplied by the records of the period of five years and a half, during which the Registration Act has been in operation, allow of the deduction of tolerably precise inferences as to the absolute and relative frequency of cancer. It is true that fatal cases only figure in the registers, and that consequently some correction must be made for instances of cure, and for those in which individuals having cancers (destined ultimately to prove the causes of death, had events followed their natural course) are suddenly cut off by suicide, death by violence, certain inflammatory affections, &c. To the number of cases, where the cause of decease is not mentioned in the registers, cancer may likewise furnish a small quota. It is probable, again, that of deaths entered under the heads of "tumor" and of "disease of the genital organs," especially of the womb, a large proportion was caused by carcinoma; the same is true, though to a less degree, of fatal cases of organic disease of the intestinal canal and of "stricture of the rectum and œsophagus" in persons of advanced age. All these sources of error are, however, of comparatively slight moment.

The following table exhibits the absolute numbers of deaths from cancer in England and Wales during the period mentioned, and the ratios borne by these numbers to the population and to the general mortality from all specified causes.

Years.	A. Total Deaths from specified causes.	B. Deaths from Cancer.	C. Proportion of Deaths from Cancer out of 1,000,000 Deaths from all specified causes.	D. Proportion of Deaths from Cancer out of 1,000,000 living.
1837*	141,607	1228	8672	174
1838	330,559	2448	7405	166
1839	330,497	2691	8142	178
1840	351,757	2786	7920	181
1841	336,664	2746	8156	176
1842	342,774	2941	8580	186

From this table it follows that a mean number of 2644·66 persons are annually cut off by cancer in England and Wales, or as closely as possible 176·83 of every million living; and that 8045·83 per million of all deaths are due to this disease.

Supposing the disease to be in all instances necessarily mortal, and of the mean duration of three years and a quarter (see p. 138), it will follow that the number of persons, suffering from cancer in England and Wales at any given moment, averages 8595.

Cancer is said by Mr. W. R. Wylde† to have furnished 3890 deaths in Ireland in the course of ten years, or 1 in 305·23 of the deaths from all causes. From this estimate deaths occurring in persons of tender years, though referred in the registers to cancer, are excluded by this writer.

§ II. I formerly endeavoured to ascertain whether the frequency of cancerous disease were on the increase. The only statistical facts I could then find bearing on this question are given in the following table, showing the ratio of cancerous deaths to the *total mortality* of the metropolis during the last century.

Time.	Proportion of Deaths from Cancer in London in 1000 Deaths from all causes.
From 1728-57 (30 years)	2·0
„ 1771-80 (10 years)	3·4
„ 1831-35 (5 years)	4·4‡
„ June 31, 1837 to Dec. 31, 1838§ (18 months)	6·1

* The registration of 1837 embraced only the last six months of the year; in all the others a period of twelve months is understood.

† Commentary on the Tables of Deaths published in the Census of Ireland for 1841, in Ed. Med. and Surg. Journal, April and July 1845.

‡ These three proportional numbers are taken from a table calculated by Mr. Farr, and given at p. 577 of his "Vital Statistics."

§ The absolute number of deaths from cancer registered in the metropolis during this period was 470.

From this it would, on first view, appear, that the frequency of the disease has been steadily increasing during the last century; but the real causes of the augmented ratio are, there cannot be a doubt, the decrease of mortality from epidemic diseases, and the greater accuracy of diagnosis, as respects carcinomatous affections.

However, the table of annual mortality from cancer (p. 140) seems to show that not only has the absolute number of deaths from the disease in this country been on the increase during the last five years, but also the ratio, borne by deaths from cancer to the total mortality and to the population, successively risen. Attentive examination of the registers has however convinced me that the main and essential cause of this is the increasing accuracy of diagnosis on the part of practitioners throughout the country,—the vague terms employed during the early years of the operation of the Act are gradually disappearing, and precision is in all respects becoming comparatively common. Besides, the disease itself is better understood than it was some few years past, and encephaloid growths are now habitually classed in their proper place with cancer.

M. Tanchou infers from the annual Paris returns for the years 1830 to 1840 inclusive, that the frequency of cancer is greatly on the increase. Yet, if the single year 1830 be excepted, (and here the share of deaths from cancer is so much below the average, that some special cause *must* have raised the quota arising from other affections,) no notable variation either above or below the annual mean is to be seen in any year. It is wholly at variance with the principles of statistics to assume that, because the ratio of deaths from any given disease to that of the total mortality increases, the absolute frequency of that disease is on the increase; the very contrary *may be* the truth.

M. Rigoni Stern* attempts to show that a marked increase has, for the last eighty years, been steadily taking place in the frequency of the disease at Verona,—and further, that the increase is due to the female sex, and to uterine cancer. The tables he has published (and from which the following is arranged) can scarcely be considered satisfactory; is it credible that ten years should pass (1770-1779) without a single death from uterine cancer, while in another decennial period 113 individuals fell victims to the disease? The signification of the term must have meantime changed in that part of Italy.

* Annali Universali di Medecina, vol. cx. p. 484. 1844.

Decennia.	Deaths from Cancer.					Ratio of mortality from Cancer to total mortality, which = 100.
	Males.	Females.				
		Breast.	Uterus.	Other Organs.	Totals.	
1760—1769	14	33	5	30	68	0·48
1770—1779	18	44	—	46	90	0·62
1780—1789	18	51	7	46	104	0·68
1790—1799	19	49	30	52	131	0·76
1800—1809	21	35	52	43	130	0·73
1810—1819	17	40	80	25	145	0·86
1820—1829	16	42	78	31	151	0·95
1830—1839	19	31	113	37	181	0·93
	142	325	365	310	1000	0·75

§ III. With the view of ascertaining whether *season* exercise any influence on the mortality from cancer, I have collected the deaths from that affection occurring in the Metropolis in the different quarters of the years 1838, 1842, 1843, and 1844,* distinguishing the sex throughout. The results are exhibited in the subjoined table, which comprises 1810 deaths.

Quarters ending	1838.		1842.		1843.		1844.		Totals.
	M.	F.	M.	F.	M.	F.	M.	F.	
March 30	18	73	20	79	14	79	46	95	424
June 30	8	40	20	88	33	95	28	142	454
Septr. 31	11	64	20	89	29	118	26	95	452
Decem. 31	14	57	28	87	31	106	39	118	480

The negative inference deducible from these columns is more clearly seen, when the deaths occurring in the two more genial quarters of the year are compared, as in the next table, with those which took place in the more inclement pair.

	Males.	Females.	Totals.
Temperate half-year . .	175	731	906
Cold half-year . . .	210	694	904

From these facts it appears obvious, that lowness of temperature and excess of moisture in the air exercise no influence in bringing the career of cancerous persons generally to a close. But a remarkable difference appears to exist between the sexes in this respect, the warm months being precisely to the same amount more fatal than the cold among females, as the cold are more destructive

* For the unpublished returns for 1843-44 I am indebted to Mr. Farr.

than the warm among males. I confess myself unable to suggest a solution of this enigma.

SECTION VIII.

ETIOLOGY.

I SHALL consider the etiology of cancer under the heads of specific, predisposing and exciting causes, and of predisposition.

§ I. *Specific causes.*—I. *Infection.*—The opinion that cancer ranks among diseases transmissible from individual to individual by means of an infectious principle, is not, even at the present day, without its supporters. The earliest positive asseveration on the subject appears to be that of Zacutus Lusitanus;* this writer affirms that three boys were attacked with cancer, in consequence of having for a long period occupied the same bed as their mother, who fell a victim to the disease. Similar unauthentic statements referring the development of the disease (in persons presumed to have been previously healthy) to close and habitual communication with cancerous patients, appear in early writings. Tulpius† tends even to terrify the medical attendants of such sufferers, by affirming that he had a malignant ulcer in the throat, in consequence of looking too closely at a cancer of the breast, which likewise became communicated by infection to the nurse of the original patient. Tulpius got rid of his ulcer, as soon as the slough, "caused by the cancerous virus," had been excised.

Although there can be no difficulty in denying the cancerous nature of the ulcer in the case of Tulpius, and though sober men are called upon to reject the tale of Zacutus (a professed relater of marvels), still it must be admitted, as matter of observation, that persons having closely tended the victims of cancer, have occasionally themselves become its subjects. Yet obviously such sequence by no means justifies the notion of any kind of connexion but that of accidental coincidence. Of the thousands of individuals yearly engaged in attendance on cancerous persons, how many become similarly affected? Were the disease thus transmissible, would it not be common to hear of husbands, sharing for years the bed of their cancerous wives, being seized with the malady?—yet a single authentic instance of such an occurrence remains to be recorded.

There is no satisfactory evidence to prove that an outbreak of the disease is particularly prone to occur even in persons who, while

* Prax. Med. Admirand. lib. i. obs. 124.

† Observat. Med. lib. iv. cap. 8.

they are strongly predisposed to the disease, expose themselves habitually to the emanations from cancerous persons. To demonstrate the fact, granting its reality, would be extremely difficult, indeed next to impossible; but to admit influence of this secondary importance is not repugnant to reason.

II. *Contagion.*—Peyrilhe* attributes to Tulpius the statement that a man, in the hope of relieving her sufferings, sucked the breast of his wife, labouring under mammary cancer, and was himself shortly after destroyed by cancer of the gums. Gooch† relates the "history of a cancerous disease, which arose from drinking some liquor impregnated with the matter that issued from an ulcerated cancer."

In respect of the first of these cases, Bayle avers that the alleged account is not to be found in the writings of Tulpius; and, in respect of the second, the inference of Gooch is, as far as I can discover, utterly unjustified by the narrative.

III. *Inoculation.*—The application of cancerous matter to a broken surface has been considered capable of producing similar disease. Peyrilhe introduced some cancerous matter under the skin of a dog, and produced, as he implies, a carcinomatous ulcer. But the only ascertained effects were violent inflammation and gangrene; the ultimate results of the experiment were not known, as the animal was lost sight of.

All other evidence on this question is totally opposed to the notion of the disease being inoculable. MM. Alibert,‡ Biett, and several pupils of the Hôpital St. Louis, inoculated themselves with the ichorous discharge of cancerous ulcers without suffering any particular effect from the operation. Secondly; Dupuytren introduced pieces of cancerous growths into the stomachs of animals, without observing any special effect. Thirdly; it has been noticed by Bayle that among a considerable number of men who had habitual intercourse with women affected with ulcerated cancer of the cervix (of which the existence was established by post-mortem examination) not one presented the slightest symptom of such disease. In a single instance only, an eruption of small pimples occurred at the extremity of the penis immediately after coitus, but it disappeared spontaneously in a few days, and differed in nowise from the eruption occasionally produced by acrid leucorrhœal discharge. I have known women, afflicted with advanced cancer

* Diss. de Cancro. † Cases and Remarks, &c. p. 39.

‡ Description des Maladies de la Peau observées à l'Hôpital St. Louis, p. 118. 1806.

of the uterus, take refuge in hospitals from the importunities of their husbands,—these men were perfectly free, according to the assurance of their wives, from ulceration of any kind. Fourthly; it has been correctly remarked by Jäger, that surgeons have frequently wounded themselves in the extirpation and dissection of cancerous growths, without suffering in consequence from carcinomatous disease. Fifthly; it has been said that the extension of cancer from the penis to the scrotum, and from the lip to the chin, is commonly produced by the ichor trickling from the original site of disease; but the statement is altogether matter of fancy. And the admission of such influence is opposed by the facts, that the vagina of women affected with cancer of the uterus may remain unulcerated for years after discharge has commenced from the former organ, and that the anterior wall of the vagina generally suffers before the posterior, though the latter is specially exposed to the influence of gravitation.

IV. *Venous injection.*—Dupuytren injected the ichor of cancer into the veins and into the serous cavities of animals, without producing any result but such as would have followed similar introduction of any simply irritant matter. Considerable interest was excited some years past by a statement on the part of Langenbeck of Göttingen, that he had succeeded in producing cancers by injecting cancerous pus into the veins. Though aware of the statement at the time the article in the Cyclopædia was published,* I abstained from noticing it, under the persuasion that it would be found erroneous. My persuasion was destined soon to be justified; for shortly after, passing through Brussels, I found Professor Gluge in vain attempting to reproduce in rabbits the appearances described by Langenbeck. I have heard within the last few months from M. Gluge, that all his subsequent essays have proved equally unsuccessful (see p. 109).

§ II. *Predisposing causes.*—These may be considered under the subdivisions of *hereditary*, and *acquired.*

I. *Hereditary transmission.*—The question whether the disease is transmissible from parents to their offspring is one which has repeatedly been mooted, and decided chiefly on theoretical grounds, or from very limited observation, in the affirmative and negative alternately. Whatever be our general theory of hereditary influence, a satisfactory conclusion regarding its connexion with cancerous disease can only be obtained by the well-advised application

* Originally published in Schmidt's Jahrbücher, Langenbeck's paper was translated in l'Expérience for April 1840.

of the numerical method. The only absolute demonstration of it reality would be the discovery, that, of a large mass of cancerous in dividuals, a very considerable majority were born of parents similarl diseased; and that, of a like series of persons unaffected witl carcinoma, a small minority, at the most, sprang from a canceron father or mother. Additional confirmation of the fact would be had were it proved that the mean period of manifestation of the diseas were materially earlier among cancerous individuals born of parent similarly affected, than among persons of untainted parentage While, however, the existing want of satisfactory proof of the he reditary origin of carcinoma is incontestable, the presumption i favour of such origin is, on the other hand, strong enough to justif the practitioner in acting as if its existence were matter of demon stration, especially as no evil can accrue from his doing so.* have met with several cases myself in which my conviction of sucl origin was as complete, as conviction can be complete independentl of absolute proof. Few practitioners, indeed, question the realit of hereditary transmission.† M. Leroy d'Etiolles (loc. citat.) however, finds but 1 in every 278 cases ascribed to this cause b the practitioners of France.

II. *Acquired causes.*—These comprise certain organic conditions social condition and climate,—in fact, all circumstances which ma be supposed to prepare individuals, as it were, for the influence o the direct causes of disease.

(A.) *Organic conditions.*—(*a.*) *Age.*—The different species of car cinoma have been known to originate at every period of existence. I a remarkable case described by Billard,‡ development of scirrhu had taken place in the heart during intra-uterine life. Under th head of Meningeal Cancer I shall have occasion to refer to tw cases in which that affection existed at birth. Mr. Travers § ha figured a specimen of congenital encephaloid of the eye, observed b himself and Sir A. Cooper, when the infant was eight months old at birth, the eyeball was as large as a walnut. A case of congenita scirrhus of the stomach has been related by Mr. T. Wilkinson; ||

* See Part I. Chapter VII. Section I.

† For a very remarkable instance of prevalence of the disease among both mal and female members of a family, the reader may refer to Warren on Tumors p. 281; the curious will find much speculation on the subject in M. Recamier' second volume.

‡ Traité des Maladies des Enfans, Pl. viii. fig. 2. 1828.

§ On Diseases of the Eye, Pl. v. fig. 2.

|| Edinb. Monthly Journal of Medical Science, No. I. January 1841.

and Rokitansky* has seen scirrhus of the pancreas in a new-born infant. On the other hand, persons of the most advanced age are not exempt from all chance of the disease: M. Cruveilhier has known uterine cancer manifest itself at the advanced age of eighty-four; James Hill, cancer of the face in a woman aged ninety-three;† and such cases are not excessively rare. The general sense of authors on this point, however, is that the disease rarely occurs in early life, seldom originates in old age, and is especially frequent in both sexes between the ages of thirty-five and fifty.

Statistical documents upon a large scale are obviously requisite as a foundation for any positive opinion on the influence of age in generating the disease. For the first element in the determination of the point, namely the absolute frequency of carcinoma at different ages, the invaluable returns supplied to the Registrar-General furnish the necessary data. I consequently obtained permission to examine the records kept at Somerset House;‡ in applying to this source there were some particular advantages not usually enjoyed by those who have endeavoured to determine the influence of age on diseases by statistical evidence: their cases have, with few exceptions, been collected in hospitals, consequently among individuals of a particular age, of a certain station in society, and usually exposed to *peculiar* influences destructive of health. The Registration includes persons of every rank and of every age; in using the documents it furnishes, I was consequently protected from numerous sources of error. Fortunately, too, for the present purpose, cancerous disease, before it proves fatal, exhibits its characters in so marked a manner, as to leave little apprehension of mistakes in diagnosis having occurred with any frequency. And, at all events, to whatever extent such errors may have taken place, the chances are that they happened at each age in proportion to the frequency of the disease at that period of life.

Twelve hundred cases seemed sufficient for obtaining the rate of mortality; and to this number I accordingly limited my extracts. Since the time I published these results, Mr. Farr has himself supplied some valuable tables exhibiting the frequency of various diseases at different ages; I shall avail myself of these, placing the different series of results in juxta-position.

* Handb. der Path. Anatomie, B. iii. S. 393. 1840.

† Cases in Surgery. 1772.

‡ For the Registrar-General's permission, I am indebted to the obliging interference of Mr. Farr; and seize the opportunity of expressing my gratitude to that gentleman not only for this kindness, but for several suggestions regarding this branch of my subject.

TABLE

SHOWING THE ABSOLUTE MORTALITY FROM CANCER IN BOTH SEXES, AND AT VARIOUS AGES.

Age in years.	A. In England and Wales generally.* Years 1837—38.			B. In the Metropolis, in 1842,† 43, and 44.		C. In 24 Town districts in 1840.		Grand Totals of A, B, and C, for both sexes.
	Males.	Females.	Totals.	Males.	Females.	Males.	Females.	
0 to 1	..	2	2	4	2	1	..	9
1	2	1	3	5	7	..	..	15
2	1	4	5	..	..	..	..	5
3	..	1	1	1	6	..	1	9
4	..	1	1	..	..	2	1	4
5 to 10	3	2	5	5	6	..	1	17
10 — 15	1	4	5	4	2	1	..	12
15 — 20	3	5	8	9	30	2	1	50
20 — 25	4	2	6					
25 — 30	1	13	14	38‡	131	5	5	199
30 — 35	6	23	29					
35 — 40	15	43	58	58	313	12	21	491
40 — 45	19	77	96					
45 — 50	23	98	121	87	299	10	56	669
50 — 55	34	130	164					
55 — 60	35	120	155	76	255	15	65	730
60 — 65	44	110	154					
65 — 70	45	88	133	42	107	10	59	505
70 — 75	35	69	104					
75 — 80	30	49	79	5	31	12	22	253
80 — 85	16	28	44					
85 — 90	1	8	9	..	2	3	5	63
90 — 95	2	1	3	..	..	..	1	
95 — —	1	..	1	..	..	..	..	5
Totals.	321	879	1200	334	1191	73	238	3036

From this table of 3036 deaths from cancer we learn the absolute numbers of individuals of each sex cut off by the disease at the various periods of life specified. The three separate series strikingly corroborate each other,—a fact very materially increasing the value and significance of each.

But were we to conclude that these numbers, representing the frequency of, disclose the relative tendency to, the disease at different ages, (in other words, the influence of age on its generation,) we should fall into a very serious error. It appears, for example, that 250 females (Series A.) die of cancer between the ages of 50

* Collected by the author.

† Appendix to Fifth Annual Report of the Registrar-General, by Mr. Farr, 1843; here are, also, some unpublished results.

‡ In Mr. Farr's tables the deaths are arranged decennially, from the age of twenty upwards.

and 60, while 118 perish between those of 70 and 80; but if the total number of females living of the former age were double that of those alive of the latter, the proportional mortality at both decennial periods of life would be as nearly as possible equal, instead of being in one of them double that of the other. In a word, in order to ascertain whether particular ages exercise any influence on the development of the disease, we must compare the absolute mortality with the total number living at each age. This I have been enabled to do with the assistance of the population estimates of Mr. Rickman,* and the result is exhibited in the following table.

TABLE

SHOWING THE PROPORTION OF DEATHS FROM CANCER IN ONE THOUSAND LIVING OF EACH SEX AT THE DIFFERENT AGES.

Ages.	Males.	Females.	Mean.	Ages.	Males.	Females.	Mean.
Under 5	·006	·017	·012	40 and under 50	·140	·983	·561
5 and under 10	·007	·004	·006	50 „ 60	·290	1·066	·678
10 „ 15	·002	·010	·006	60 „ 70	·636	1·192	·919
15 „ 20	·009	·017	·013	70 „ 80	·935	1·421	1·178
20 „ 30	·010	·024	·017	80 „ 100	1·207	·973	1·089
30 „ 40	·058	·152	·105	All ages . . .	·103	·245	·174

A glance at this table will suffice to show the inaccuracy of the commonly received opinion, that the tendency to cancer reaches its maximum between the thirty-fifth and fiftieth years. The mortality, on the contrary, goes on steadily increasing with each succeeding decade until the eightieth year; after that period the results are, from causes which it is needless to enumerate, liable to slight error, and may therefore be omitted in the general survey. It is worthy of note, that the mortality from this disease is lowest at the same period of life as the general mortality from all causes indiscriminately, namely from the tenth to the fifteenth year.

The law of mortality differs strikingly in the two sexes; the

* Rickman, *Population Abstracts*, Preface, p. 38. This table was calculated by assuming as a basis the annual rate of mortality from cancer in 1837, then deducing from the opposite table (Series A.) the relative proportion of deaths from cancer at decennial periods of life, next ascertaining from the population returns the relative numbers living at those periods, and dividing the former by the latter. Thus the female deaths from cancer at the age of 20 to 30, divided by the number of women living at that decennial period, gave ·024 per 1000,—the relative mortality from cancer at that age. There are some other intermediate steps in the calculation, which it is not necessary to state particularly.

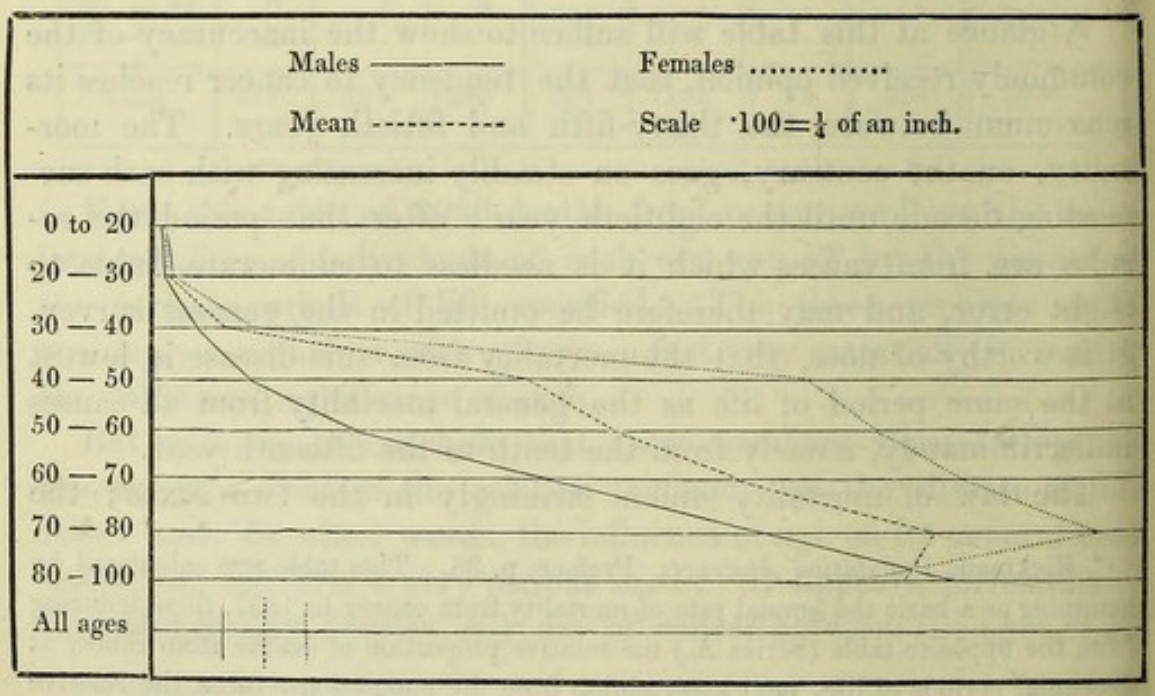
most general character of this difference being the greater regularity of increase with advancing age among males. Passing over the first twenty years, at which period the number of cases is probably too small to admit of very useful comparison, we find, it is true, that the number of deaths from æt. 30 to 40 is in both sexes about six times greater than from æt. 20 to 30; but here the similitude of increase ceases: in the next decennial period the deaths among females augment more than sextuply, while the mortality of males only increases two and a half times, &c.

To the period of death, and not of development of the disease, the above table, of course, immediately refers; but as the ages are arranged in decennial periods, and the mean duration of cancer of all kinds, in all organs, and in persons of every age, does not in all probability much exceed three years, the error would be slight were the results applied to the period of development.

The subjoined diagram, constructed on a plan much employed of late years by statistical writers, will make these facts apparent to the eye,—number being represented by space.

DIAGRAM

SHOWING THE RELATIVE MORTALITY FROM CANCER AT DIFFERENT AGES IN BOTH SEXES.



The fact likely to be most strongly impressed on the reader by this diagram is the enormous and abrupt increase of female mortality between the ages of thirty and fifty; an increase which accounts for the erroneous notion that the disease reaches its maxi-

mum frequency at that period of life, and lends support to the current belief respecting the connexion of the development of uterine and mammary cancer with declining activity and cessation of the genital functions. I have ascertained the apparent reality of their connexion still further by comparing the above results with a table showing the intensity of fecundity of women at the different periods of life in Sweden and Finland:* from this curious document it appears that the intensity of fecundity, which had been pretty uniform from æt. 25 to 40, suddenly falls to $\frac{1}{5}$ of its previous amount from æt. 40 to 50.

The *mean age* at death in the 1200 cases of cancer extracted from the Registers by myself was 57·2 years; in the male sex 59·4 years, in the female 56·1 years. M. Marc d'Espine† found that the mean age of 69 persons cut off by cancer in the canton of Geneva in 1838 was 57·9 years,—a result strikingly similar to my own.

M. Tanchou (loc. cit.) supplies the following valuable table of 9118 deaths from cancer occurring in Paris and the environs between 1830 and 1840.

Ages.	Males.	Females.	Totals.
1 to 10	9	14	23
10 — 20	13	13	26
20 — 30	62	169	231
30 — 40	190	822	1012
40 — 50	339	1636	1975
50 — 60	488	1620	2108
60 — 70	598	1469	2067
70 — 80	398	917	1315
80 — 90	62	273	335
90 —100	4	22	26
Totals .	2163	6955	9118

M. Rigoni Stern gives an interesting table showing that the ratio of deaths from cancer among females of any given age to the total mortality among them from that disease varies almost in identically the same manner with that age at Paris and Verona: the maximum is at both places between the ages of forty and seventy.

Influence of age on species.—It may be stated as a general truth that scirrhus is particularly prone to appear in adults, while ence-

* This, which is I believe the only table of the kind in existence, may be seen in Milne on Annuities, vol. ii. p. 582. It is highly probable that the law of fecundity is the same in this country; at least the period of menstruation is sufficiently close in the two latitudes to render the existence of any material difference in this respect exceedingly unlikely.

† Edinb. Med. and Surg. Journal, vol. liv. July 1480.

phaloid is the species to which the morbid growth usually belongs in infancy and youth. I have never seen colloid in persons under thirty years of age; nor do I believe it has ever been observed in very early life.

But a tendency to exaggerate the predilection of scirrhus for old, and of encephaloid for young, organisms, is a most common error. I have referred to the existence of scirrhus in the fœtus, and the following table constructed from the work of Herrick and Popp will be useful in further exposing the prevalent mistake.

Ages.	*Encephaloid.* (25 cases.)		*Scirrhus.* (23 cases.)		*Scirrho-Encephaloid.* (19 cases.)	
	Males.	Females.	Males.	Females.	Males.	Females.
20 to 30	..	1	1	1	..	1
30 — 40	..	1	3	..	1	3
40 — 50	2	2	..	3	2	1
50 — 60	2	5	3	3	2	1
60 — 70	4	5	1	4	2	3
70 — 80	..	1	..	1	1	2
80 — 90	1	1	1	2	..	..

(*b.*) *Sex.*—There is no fact in the history of cancer more absolutely demonstrated than the influence exercised by sex on its development.

TABLE

EXHIBITING THE RELATIVE FREQUENCY OF CANCER IN THE TWO SEXES IN ENGLAND AND WALES.

Time.	Absolute number of Deaths from Cancer.		Number of Deaths from Cancer out of 1,000,000 living of each sex.		Ratio of Mortality from Cancer in the two sexes.	
	Males.	Females.	Males.	Females.	Males.	Females.
1837*	355	873	103	245	1 :	2·38
1838	620	1828	84	240	1 :	2·74
1839	660	2031	87	259	1 :	2·98
1840†	648	1759				
1841	568	1805				
1842	664	1848				
Totals .	3495	10,144				

Hence it follows that the female population of this country is destroyed to about two and three quarter times as great an extent by cancer as the male,—a difference the more remarkable from the

* Refers to a period of six months,—all the others to one of twelve.

† The three last years refer to England and Wales, exclusively of the metropolis; the three first to the entire kingdom.

fact, that the mean rate of mortality from all diseases is 20·8 per thousand among males, while it is 19·7 among females.

The Paris registers, as consulted by M. Tanchou, give 6967 deaths from cancer among females, for 2161 among males. I have no means of drawing an accurate inference from these figures as to the influence of sex in Paris, for I have been unable to ascertain the ratio of the male to the female population. The same observation applies to the statement of M. Rigoni Stern, that 1000 women, and only 142 men, died of cancer at Verona between 1760 and 1839 (see the table, p. 142).

Forty-seven deaths from cancer occurred in 1838 among the female population of the canton of Geneva, 22 among the male.*

Sixty-seven cases of cancer observed at Ratisbon by MM. Herrick and Popp were distributed thus between the sexes:

	Encephaloid.	Scirrhus.	Scirrho-Encephaloid.	Totals.
Males . .	9	9	8	26
Females . .	16	14	11	41

(*c.*) *Temperament.*—Of 44 cancerous persons, whose original constitutional bias was sufficiently marked for purposes of observation, 20 were of lymphatic, 12 of sanguineous, 8 of bilious, and 2 of nervous temperament. This numerical result, obtained from personal observation by M. Ferrus, has been since quoted as decisive of the influence of the lymphatic constitution on the disease. But (setting aside the smallness of the numbers from which the conclusion is derived) no inference of any kind can be drawn from them; as the proportional frequency of the different temperaments in the individuals forming the floating population of the hospital, where the cases were observed, is not known. And, indeed, as the hospital in question, the Salpétrière, receives female patients only, in whom the lymphatic temperament is probably the most usual, unless such temperament were actually prophylactic against carcinoma, the result could be none other than that obtained by M. Ferrus.

Sabatier conceived he had ascertained, from the experience of years, that women of high colour and sanguineous temperament were more subject to mammary cancer than those of different constitution.† Mr. Lever has numerically proved a similar position

* Marc d'Espine, Ed. Med. and Surg. Journal, vol. liv. July 1840.

† Médecine Opératoire, tom. ii. p. 276. Parr (Dict. in voc.) affirms that he encountered the disease most frequently in persons of dark, cadaverous, and blue-brown complexion. Rather a singular union of tints,—though not one unknown to the hospital observer.

in respect of cancer of the uterus.* M. Tanchou† echoes the opinion of Sabatier; and my own experience leads me to coincide unequivocally with these observers.

(*d.*) *Marriage or celibacy.*—It is difficult for many reasons to ascertain whether the married or single state is most favourable to the development of the disease in females. Among 172 females whose matrimonial condition I extracted, as noted in the registers, I found 17 spinsters, 84 married women, and 71 widows. But, as the proportional number of females belonging to each of these classes in England has not been ascertained, these absolute numbers cannot lead to an accurate decision of the point. If, however, acting on the supposition that the proportions are pretty equal in different European countries, we take those ascertained by census for the Parisian population, and compare them with our deaths from cancer, the following results, which may be looked upon as an approximation to the truth, are obtained. Of the unmarried ·07, of the married 0·48, of widows 1·32 per thousand, die from carcinoma. But these proportions are beyond question mainly influenced by the mean *age* of the different classes of women furnishing them.

Some further observations on this point will be found in the chapter descriptive of Uterine and Ovarian cancer.

(*e.*) *Menstruation, pregnancy, miscarriage, and parturition.*—I have already (p. 151) communicated the only positive inferences obtainable concerning the connexion of menstruation with cancer generally; under the head of Uterine cancer I shall inquire how far the different conditions above mentioned excite a tendency to the disease in the organ chiefly concerned.

(*f.*) *Lactation.*—It is probable that women who suckle their offspring are less exposed to the risk of cancer of the breast than those who consign the duty to others. But although this is matter of fair presumption, it requires to be numerically proved. The opposite practice, so common among the more indigent classes in this country, of protracting lactation to such an extent as to exhaust the energies of the mother, must indubitably promote permanent deterioration of her constitution; but whether it may have any special power in generating cancer of the breast, is a point yet open to inquiry.

(*g.*) *Pre-existing state of health.*—It becomes obvious from what has been already said (p. 113) that a state of general ill-health

* Med. Chir. Trans. vol. xxii. 1839. † Op. cit. p. 266.

cannot, to say the least, be considered a constant harbinger of cancerous development. I shall have occasion, hereafter, to show on the other hand that certain depraved states of constitution seem to constitute a barrier to the generation of cancer,—the tuberculous diathesis is thus characterised (see p. 185).

It has become a matter of habit with writers to affirm that a syphilitic taint of the constitution facilitates cancerous formation, even in organs unconnected with those primarily affected with the venereal poison; and lately M. Leroy d'Etiolles has found 1 in 5 cases ascribed to syphilis by the practitioners of France. The comparative immunity of prostitutes from the disease in the organs most likely to suffer, militates most strongly against the accuracy of these opinions and results.

The returns supplied to M. Leroy from the same sources also ascribe 1 in 16 cases to scrofula.

(*h.*) *Depraved habits.*—Drunkenness, general debauchery, and even excessive smoking have been set down as causes of cancer. In 20 cases, where anterior circumstances appeared to MM. Herrick and Popp to have had distinct influence on the appearance of cancer, habitual drunkenness was noted six times, debauchery once.

(*i.*) *Mental affliction.*—Much has been written on the influence of mental misery, sudden reverses of fortune, and habitual gloominess of temper on the deposition of carcinomatous matter. If systematic writers may be credited, these constitute the most powerful cause of the disease; and Lobstein, assuming the fact as established, exercises his ingenuity in tracing the connexion of cause and effect: moral emotions produce defective innervation; this, perversion of nutrition; which in its turn causes the formation of carcinoma. Whether this be the real catenation of circumstances or not, and although the alleged influence of mental disquietude has never been made matter of demonstration, it would be vain to deny that facts of a very convincing character, in respect of the agency of the mind in the production of this disease, are frequently observed. I have myself met with cases in which the connexion appeared so clear and decisive, that to question its reality would have seemed a struggle against reason.

But the extent to which this influence works practically, has doubtless been over-estimated. It should be recollected that cancer is a very rare affection before the thirtieth year, and that the number of persons fortunate enough to reach that age without having suffered under disappointed hopes and wasting grief, is, in all probability, comparatively small. Authors who dwell most strongly

on this mode of causation of the disease, curiously enough fix on the middle ranks of society as those furnishing the least amount of cancerous disease; yet these are precisely the classes in which reverses of fortune most frequently occur, and in which mental anxiety, inseparable as it is from professional and commercial pursuits, must be strongest and most constant.

(*k.*) *Intellectual labour.*—Sustained intellectual labour has been speculatively set down as a cause of cancer. The opinion rests upon no solid foundation; and it is obvious that until persons, whose lives have been devoted to study, be proved numerically to suffer from the disease to a greater amount than the population generally, the notion must be esteemed merely hypothetical.

(B.) *Social conditions.*—(*a.*) *Profession, &c.*—(1.) The broadest division of occupations, considered in a hygienic point of view, is into those connected with *agriculture* on the one hand, and with *trade, manufactures*, and *handicraft* on the other. It may not be without utility to inquire, as far as available documents enable us to do, into the relative liability of individuals belonging to these great divisions of society to suffer from cancerous diseases. This is not done by the mere comparison of towns and rural districts (p. 162), for numbers of individuals engaged in agricultural pursuits may be inhabitants of towns, and *vice versâ*. I shall select for this comparison Birmingham, as furnishing the greatest excess of trading over agricultural families, and a division of the kingdom, comprising Cambridge, Huntingdon, and the southern parts of Lincoln,

	Number of Families employed in		Other Families.	Deaths from Cancer: July—Dec. 1837.
	Agriculture.	Trade, Manufactures, Handicraft.		
Birmingham	301	20,763	2,870	14
Counties named..	35,105	18,813	13,433	30

as exemplifying the converse condition. Calculating from the populations estimated approximatively for the period in question, the annual mortality from cancer in Birmingham—where the families engaged in trade and artisanship are *sixty-nine* times more numerous than those employed in agriculture—is ·224 per thousand; while in the rural districts enumerated, where the latter class of family is about double as numerous as the former, it is ·178. The advantage appears somewhat in favour of agricultural pursuits on first view; but the lower rate of mortality is evidently quite out of

proportion with the vast relative minority of manufacturing families in the country districts.

(2.) In the *mining* districts of Staffordshire, Shropshire, Worcestershire, Northumberland, and Durham, of which the combined population in 1831 was 542,398, the deaths from carcinoma were ·42 in six months; so that ·155 per thousand of the inhabitants perish annually from that disease. This is the lowest proportion yet noticed; and it would be still lower, were it possible to calculate from the real population furnishing the deaths, namely that of 1837. Nevertheless, a large share of these people are constantly exposed to the influence of impure and damp air, and deprived of the vivifying influence of the sun's rays.* Such conditions cannot, however, be inferred in the smallest degree to guard this class of labourers from cancer; the real reason of their comparative immunity from the disease is, that the mean duration of life is materially lower among miners than other labourers: they are cut off by maladies incidental to their condition before reaching the age at which cancer becomes common.

(3.) M. Benoiston de Chateauneuf† has shown, in a paper on the mortality of the French infantry, that, out of a total number of 4915 deaths occurring in six years in a military body 723,741 strong, 33 were from "cancer and ulcers." Hence the annual mortality is only ·045 per thousand from those affections; and 6·71 per thousand of the total number of deaths are thus produced. Now the rate of mortality from cancer among civilians is at least as high in France as in England. The cause of the apparently very low proportion in the army is, however, easily explained. The age at which youths are eligible for the conscription is twenty-one; when enlisted, they are obliged to serve six years (if in the infantry), and then given their *congé*—the mean age of the great majority of foot-soldiers is, therefore, twenty-three and a half. Now, on referring to the table I have given at p. 149, it will be found that the rate of mortality per thousand among English male civilians from twenty to thirty is only ·010; hence the chances would appear considerably against, instead of being in favour of, a

* The valuable observations of Dr. Forbes on the diseases of miners substantiate the inference in the text. Although "there is an extraordinary superiority in the rate of mortality in the mining parishes over the agricultural, and even those containing towns and crowded villages," this superiority evidently does not in any degree spring from the prevalence of cancerous disease. (See Provincial Med. and Surg. Transactions, vol. iv. p. 215.)

† Annales d'Hygiène, tom. x. p. 239. 1833.

military life in respect of this disease. But other causes may contribute to produce this result—and the exact signification of the word "ulcers" is of course doubtful.

(4.) In the hope of throwing some light on the influence, if any, of particular kinds of occupation, I noted the trade or profession of 650 individuals as stated in the registers. The result is now laid before the reader. I have grouped together all working artisans into a single class; and individuals gaining their livelihood by labour into another; wives and daughters are ranked according to the occupation of the husband or father. This method of arrangement is justified in respect, at least, of the social position of the individuals.

MALES.		FEMALES.		Totals.
Gentlemen*	9	Ladies*	45	54
Servants	7	Servants, 36; Nurses and Midwives, 8; Dairywomen, 1	45	52
Labourers, 94; Miners, 3; Sweeps, 3	100	Labourers	94	211
		Laundresses	17	
Paupers	3	Paupers	27	30
Artisans, 60; Hatter, 1	61	Artisans, 17; and Wives, 40; Dressmakers, 7	64	125
Farmers	41	Farmers, or Wives of	29	70
Shopkeepers, 14; Auctioneer, 1; Merchants, 3	18	Shopkeepers, 25; Police Officers' Wives, 3	28	46
Tavern-keepers	4	Tavern-keepers	5	9
Sailors, 9; Fishermen, 4	13	Fishwomen, Sailors' Wives	14	27
Schoolmasters	3	Schoolmistresses	7	10
Soldiers	3	Soldiers' Wives	2	5
Clerks, Accountants	6		..	6
Players	2		..	2
Surgeons	2		..	2
	272		377	649

No conclusion of a satisfactory kind, however, can be drawn from this table until the relative proportions of individuals living, in each position or trade referred to, at the period these cases occurred, has been ascertained. Now no materials exist for the establishment of this preliminary point; and there are other conditions—of which it is next to impossible to express the influence numerically—which render the establishment of the influence of occupations on disease in general, one of the most difficult and least certain points of medical statistics.†

* By these terms are meant, it is to be presumed, independent persons, or those who follow no particular trade or profession.

† One difficulty, apparently insurmountable, arises from the habit among the very humbler orders of frequently changing their occupation.

(*b.*) *Social position.*—Although the table just given supplies no precise information as to the influence of special trades or pursuits on the generation of the disease, still it gives demonstration that no rank or station in society preserves from its ravages.

The operative classes of the community furnish a fair proportion, at least, of the general mortality from the disease. But the quantity of *death produced by cancer in proportion to the total mortality* is greater among the higher than the lower orders: this I have ascertained by comparing in the following table the proportion of cancerous deaths among individuals assured by the Equitable Society (all of them belonging to the better ranks) with that furnished by the total specified mortality of England and Wales, in the latter half of 1837, among people of every station.

	Total Mortality.	Mortality from Cancer.	Mortality from Cancer in 1000 deaths.
Persons assured in the Equitable	4,095	43	10·5
Population of England and Wales	141,607	1,228	8·6

But this by no means proves that the quantity of cancerous disease is greater in the higher walks of society than in the lower. The wealthier grades of the population—those assured in the Equitable—suffer infinitely less from the epidemic and contagious diseases disseminated and even generated by over-density of population and the evils of atmospheric impurity than the poorer orders; the former therefore are more open to the slow destruction of cancer. Besides, the selection exercised by the Assurance Companies, excluding deaths under twenty years, and consequently a vast mass of the population scarcely liable to suffer from cancer, reduces the mortality from the febrile exanthemata to a mere nothing, and lowers that from phthisis by more than half:* all these circumstances tend to increase materially the quota of deaths from cancer among the assured.

(c.) *Climate, &c.*—(*a.*) The subject of the geographical distribution of diseases commences, with the advancement of medical science through the world, to acquire interest of a high order. The period may reasonably be anticipated, when a close comparison may be instituted between all civilized states as to the relative frequency of the more important diseases within them.

(1.) The maximum amount of cancerous disease occurs in Europe, as compared with the other quarters of the globe. I have but few documents illustrating the relative frequency of the disease

* See Farr's Vital Statistics, loc. cit. p. 588.

in its different regions. The following table exhibits a most striking excess on the part of Paris over London.

	Ratio per cent. of Deaths from Cancer: To total Deaths.	To Population.
London (1841) . .	0·83	0·02
Paris . . .	2·54*	0·78*
Verona . . .	0·75	

Professor Otto, in his recent elaborate essay on the medical topography of Copenhagen† makes no mention of the disease; but I learn that the affection is by no means very unfrequent in Denmark.

(2.) In Asia the disease appears to be much less common. Of a total number of 30,102 cases admitted into the Hobart-town Hospital during twelve years, there were but four cases of "scirrhus."‡ In the pages of the Calcutta Medical Journal a passing remark on the infrequency of scirrhus and encephaloid among the Hindoos is occasionally found; and their import is confirmed by some statistics recently published of the Male and Female Hospitals at Calcutta.§ Among 4080 males admitted during a space of three years, 3 only were affected with cancer; and among 701 females admitted during two years, 2 only were cancerous,—in both the uterus was the organ affected.

In China the population suffers to a greater extent than this. And that the course and ravages of the disease are the same among the Chinese as ourselves, is shown most graphically in a series of drawings (which I have now before me ||) executed by native artists from specimens occurring in their countrywomen.

(3.) The inhabitants of Africa appear to be specially exempt from this disease. Clot Bey¶ dwells upon its rarity among the Egyptians, female as well as male, and curiously ascribes the infrequency of uterine cancer to the habit of the women of wearing drawers, whereby the genital organs are protected from eddies of cold air. M. Hamon (who is said by M. Tanchou to have passed fourteen years in the service of Mehemet Ali) never observed the disease among the indigenous female population, and but very rarely among the Turkish. M. Bax (quoted by M.

* The first of these numbers is given by M. Tanchou; the second (for 1830 only) calculated through a paper in Journal Comp. du Dict. des Sc. Méd. tom. xli. p. 440.

† Prov. Med. and Surg. Trans. vol. vii. 1839.

‡ Scott, in Prov. Med. and Surg. Trans. vol. iii. 1835.

§ Appendix to Annual Report of Medical College of Bengal, Session 1844-45.

|| Museum of University College, presented by Mr. Robert Morrison.

¶ Des Travaux de l'Ecole de Médecine d'Abou-Zabel, p. 130. 1833; and Histoire de l'Egypte, p. 371. 1840.

Tanchou) met with no case of the disease either in Algiers or Senegal during a period of six years. Nor do the tables of mortality for Algiers for 1841 and 1842 attribute death in any instance to cancer. M. Pouzin treated about 10,000 native Arabs, without meeting more than one case of cancer,—the disease was of the breast in a female.

(4.) In the tropical parts of America cancer is certainly rare. No mention of the disease occurs in the work of M. Levacher on the Medical Topography of the Antillas.*

In New York there occurred 27 deaths from carcinoma in the year 1842†—9 males, 17 females (white); 1 female (black): the deaths from this cause were to the total deaths as 1 in 370. The white population was 148,294 males; 161,179 females.

In the city and county of New York‡ 39 persons were cut off by cancer in 1838,—14 males, 23 females (white); and 2 females (black).

In the state of Massachusetts, having a population of 737,326 souls, 98 deaths occurred from cancer in the year 1841.§ Hence 133 per million of the population are cut off by the disease annually: a proportion lower than that prevailing in England (p. 140).

The foregoing survey, imperfect as it necessarily is, suffices to show that certain regions of the globe are peculiarly exempt from the ravages of cancer. But is this exemption to be really referred to the special influence of climate, or to some concomitant condition? Wherever the disease is particularly rare, it may be remarked that a low state of civilization prevails; wherever social organization is of a highly perfect kind, there cancer flourishes. May we, then, infer that, as has more than once been contended, cancer, like insanity, follows in the wake of civilization; and that as the ferment of a state of high social advancement is among the most active causes of destruction of intellect, so too it plays a prominent part in generating one of the most terrible physical evils to which humanity is subject? To answer this question satisfactorily would require documents which are at present not to be had;—but the bias of evidence is most certainly in favour of the affirmative. And it is curious that even the lower animals appear to acknowledge a somewhat analogous influence; it will presently be seen (p. 170) that they are much more subject to the disease when in a state of domestication than in their natural wild condition.

* Guide Médical des Antilles.

† Document No. 59, Annual Report of Interments. New York, 1843.

‡ Document No. 13, ibid. § First Annual Rep. for Massachusetts, 1843.

(*b.*) *Habitation of town or country.*—Among the few positions stated by Breschet (and he gives utterance to a current belief) to be thoroughly established respecting the etiology of cancer is the following: "This disease is as rare among persons employed in agriculture, and the country population generally, as it is common among the lower orders of the population of large towns."

I formerly showed that the Registration for the latter half of the year 1837* afforded clear evidence that this doctrine was stamped with exaggeration. It appeared, that in the metropolis 185 deaths occurred from cancer, while five counties of nearly equal population, Cornwall, Dorsetshire, Devonshire, Somersetshire, and Wilts, furnished 126 deaths from the same disease. But the excess, on the part of London, is not even so marked as would on first sight appear; for (calculating from the estimated populations in October, 1837) the annual mortality is ·206 per thousand living in the capital, ·143 per thousand in the counties. And, again, the number of deaths from this affection in a number of our principal manufacturing towns (Leeds, Liverpool, Manchester, Sheffield, &c.), with a total population of 1,762,710, exposed *per eminentiam* to what are esteemed the insalubrious conditions of the life of town artisans, is 152; while in a number of rural districts, containing 1,776,980 souls, 163 individuals fell victims to the disease. Finally, comparing the deaths from cancer in the metropolis and provincial towns on the one hand, with those in all the rural districts referred to on the other (337 in the former, and 289 in the latter), we obtain an annual mortality of ·189 per thousand in large towns, and of ·165 in the country. The character of this result is rendered more distinct by comparing it with the rate of mortality, from all diseases indiscriminately, in the same towns and counties: the annual mortality in the former is 27 per thousand; in the latter 16·9 per thousand, showing a remarkable minority, as regards general mortality, in favour of a country life.

The Registrations of subsequent years have one after another confirmed the inference, deducible from these facts, that a town life is far from exercising any serious influence on the production of cancer. Mr. Farr† supplies a most valuable abstract of the causes of death registered in the course of four years (1838-41) in the metropolis and twenty-five towns on the one hand, and a number of rural districts on the other, and from this I extract the following numerical results bearing on the question under consideration.

* Mr. Farr's Appendix to First Annual Report.

† Fifth Annual Report, p. 198.

Absolute number of Deaths from Cancer in Four Years.		Ratio of Deaths to 1,000,000 living, in	
Country Districts.	Towns.	Country Districts.	Towns.
2605	2684	198	183

From this it follows that rural populations are cut off by cancer actually in higher proportion than the inhabitants of towns. And if the fact be taken into consideration that many cancerous persons, who have acquired the disease in the country, remove, as an *ultima spes*, to the large town in their vicinity for the sake of the professional aid it affords, die and are registered there, and consequently swell the sum of deaths from the disease in cities, while they, *pro tanto*, diminish it in counties, the innocuousness in this respect of a city life will appear in still stronger relief.

A curious fact connected with this question is the difference of the proportions in which the two sexes fall victims to the disease in towns and in the country; the latter is more fatal to males, the former to females. This fact is clearly shown from the observations of a series of years in the following table:

		Deaths from Cancer in Metropolis and Towns.	Deaths from Cancer in Country Districts.
Males	*a*	45	42
	b	29	53
	c	247	316
	d	53 = 374	88 = 499
Females	*a*	140	82
	b	123	110
	c	1017	907
	d	260 = 1,540	259 = 1,358

Whatever be the cause of this peculiarity, observed as it has been year after year, one thing is certain,—namely, that the law in respect of cancerous diseases differs from that regulating the sexual ratio of general mortality in towns and in the country. The following numbers, representing in corresponding series the total deaths in the cities and counties referred to, furnish the proof of this statement.

		Total number of Deaths in Metropolis and Towns.	Total number of Deaths in Country Districts.
Males	*a*	12,528	7,597
	b	11,874	7,244
	c	101,673	65,226
	d	26,251 = 152,326	16,562 = 96,629
Females	*a*	12,431	7,623
	b	11,120	7,229
	c	98,801	64,402
	d	25,241 = 147,593	16,477 = 95,731

The *share of the total mortality caused by cancer in towns and rural districts comparatively* is exhibited in the following table, calculated from the Registrations of 1837, 1838-39, and 1841.

	Total Deaths from specified causes.	Deaths from Cancer.	Proportion of Deaths from Cancer to 1,000,000 Deaths from all causes.
Towns .	292,264	1914	6548·8
Counties .	185,098	1859	10043·3

This result is exactly of the kind which might have been expected: as the number of deaths from diseases, propagated or increased in severity by the insalubriousness of large towns, is necessarily less in rural districts than in cities, the proportion of deaths, from affections not thus influenced, must be higher in the former than in the latter.

M. Tanchou,* having found that 2·54 per 100 of the deaths at Paris during a certain period were caused by cancer, while in the adjoining arrondissements of Sceaux and St. Denis 1·63 per cent. only of the deaths were due to the same disease, concludes that cancer is "more frequent in towns than in the country." The conclusion is perfectly unwarranted: how M. Tanchou can conceive it correct to compare the immediate suburbs of a large town with the open country, it is difficult to understand; besides, it is obvious that the great majority of persons in the suburbs afflicted with cancer will repair to Paris for relief, and die within its walls. And, further, to infer that any one population suffers more than another from a given disease, because the mortality from that disease bears a higher ratio to the general mortality of the former than of the latter, is utterly erroneous.

(*c.*) *Habitation of a densely or thinly peopled locality.*—The influence of concentration of population is evidently null; in the metropolis there are 25,758 individuals to a square mile; in the counties, with which it has been compared (Series *a.* and *b.*) only 222,—a ratio completely out of proportion with that of cancerous disease in the two localities.

In order to elucidate this point further, I extracted from the registers 470 deaths from cancer occurring in the metropolis, from July 1, 1837, to December 31, 1838, and arranged according to the Unions in which they took place. By collecting the Unions into three groups, ascertained by Mr. Farr to present different degrees of general salubrity, it will at once appear whether cancer follows the same law in this respect, as others of the most destructive maladies. The absolute number of cases is given in the following table:

* Op. cit. pp. 257, 261.

Thirty-one Unions.	Deaths from Cancer.			Estimated Population in March, 1838.	Deaths from Cancer in 1,000,000 persons living.
	M.	F.	Total.		
A. 10 most unhealthy....	14	82	96	517,288	123
B. 11 of medium salubrity	36	103	139	505,746	183
C. 10 healthiest	46	189	235	787,785	199

Hence the mortality from cancer increases in proportion to the general salubrity of the locality. This result, which corroborates that concerning the relative number of deaths from this disease in towns and country districts, is rendered still more striking by comparing it with the calculations of Mr. Farr, of the annual mortality from all diseases, from typhoid fever and from phthisis in the same Unions:

Districts.	No. of square yards to one person.	Annual general rate of mortality per 1000.	Annual rate of mortality per thousand from		
			Typhoid Fever.	Phthisis.	Cancer.
A.	57	33·21	3·24	4·78	·123
B.	78	28·39	2·05	4·51	·183
C.	219	21·63	1·07	3·54	·199

It is not meant to be deduced from this table that general salubrity is favourable to the production of cancer, but it clearly follows from it that the influences increasing the mortality from disease in general, and from typhoid fever and phthisis in particular, (several other affections might be added to these,) exercise no such influence on carcinoma. It may perhaps be conjectured that the high quota furnished by the West-End Unions (C.) may be caused by the greater prevalence of the disease among the easier classes of the community: but if the table, I elsewhere (p. 158) give, of the social position of cancerous persons, possess no other utility, it at least is useful in the refutation of this notion,—the large share of individuals belonging to the lower orders is there distinctly shown, and both results are drawn from almost exactly the same series of facts. The number and extent of hospitals in each district are sufficiently equal to require scarcely any correction on this score.

§ III. *Exciting causes.*—These causes may be classed as mechanical, chemical, and vital.

I. *Mechanical causes.* — The influence of mechanical violence in the immediate production of cancerous disease is very generally admitted. Indeed, making full allowance for the sources of fallacy

already referred to (p. 95), the frequent occurrence of instances in which the disease, as far as it is possible to judge, originated some short while after the receipt of local injury, seems to render the occasional reality of such influence hardly controvertible. But numerical results are wanting to show the relative frequency with which this cause operates; in the vast majority of cases in which blows are received, no such disastrous consequences follow.

Observation disproves, as has been seen, the general importance of local violence in the production of uterine cancer. Evidence of the same kind exists in respect of the brain; of 43 cases of cerebral carcinoma, collected by M. Andral, two only had followed injury to the cranium. Chardel relates the case of a hatter whose trade obliged him to lean forcibly with the epigastrium against a board, and who ultimately died of cancer of the stomach; an event ascribed to the irritative pressure. But he forgets the multitudes of hatters, whose epigastria undergo similar rough treatment, and who notwithstanding descend to the grave with a sound stomach. There is on the other hand an account by Baillie of a case in which a mechanical irritant (five halfpence) had been lodged for a considerable period in the cavity of the stomach, and given rise to the formation of an adventitious cyst, without inducing the least cancerous formation. Of the bearing of these facts I shall presently speak. In connexion with this subject may be noticed a curious crotchet of M. Recamier. This writer declares his persuasion that the mere circumstance of a blow being aimed at the stomach may give rise to the disease,—alleging that an individual frightened by a gesture imitating a blow, suffered in consequence from uneasiness at the pit of the stomach, and consecutively from cancer. In the dark ages of military surgery the wind of cannon-balls worked marvels; but these sink into insignificance in comparison with M. Recamier's "attempt at a blow."

II. *Chemical causes.*—Some years since M. Bouillaud published a case of scirrhous induration of the pylorus, occurring in an individual who had suffered from gastritis caused by swallowing a quantity of nitric acid. The case is cited in evidence of the inflammatory nature of cancer. But, in the first place, it may be asked, where is the proof that the cancerous affection had not existed before the ingestion of the poison? And, admitting the reality of the alleged causation in this instance, that the conclusion *à particulari ad universale* is here singularly illogical is shown by such facts as the following, observed by Laennec, Dupuytren, and Tonnelier. A girl unexpectedly recovered after swallowing a

quantity of arsenious acid; but, repeating her attempt at self-destruction a year afterwards, succeeded. In addition to the anatomical effects of the poison just taken, a cyst about the size of a goose's egg, evidently separated recently from the pyloric region, was discovered in the interior of the stomach. The contents of this cyst were on analysis by Vauquelin found to be an ounce of crystallized arsenious acid. No appearance of carcinoma was anywhere detected.*

The action of spirituous liquors indulged in persistently and to excess may be considered somewhat allied to that of irritant poisons; and numerous authors assert that the disease is frequently induced in the stomach by the habit of drunkenness. But no proofs are given of the assertion, and it is contradicted by the fact, that, although the stomachs of persons dying with delirium tremens occasionally present the anatomical characters cf chronic gastritis, the deposition of carcinoma in that organ has not been noticed under the circumstances. Besides, how trifling is the proportion of sufferers from gastric cancer to that of habitual drunkards; and how comes it that it is not much less frequent in the sex almost exempt from delirium tremens than among males?†

III. *Vital causes.*—Facts of the description now referred to sufficiently disprove the necessary dependence of cancer upon chronic or other inflammation. But irritation is undoubtedly sometimes the immediate cause of hastening the production of the disease in individuals constitutionally prone to it; nay more, I feel disposed to admit, from facts observed by myself as well as others, that under certain conditions, at present ill understood, the disease may follow inflammation, where, without the occurrence of this process, the cancerous tendency might always have remained dormant. (See also pp. 37, 115.)

§ IV. *Predisposition.*‡ — The three preceding sections have

* Nouv. Journ. de Méd. tom. iv. p. 15, An. x.

† Of 832 patients affected with delirium tremens, and observed by Rayer, Bang, Hoëgh-Guldberg, Krüger-Hansen, and others, 18 only were females. A different statement has been given in this country, but in the form of a simple assertion, respecting the relative frequency of the disease in the sexes. See Brit. and For. Med. Rev. vol. vi. p. 324. 1838.

‡ The terms *predisposition, diathesis,* and *cachexia,* are used in various ways by different writers: in order to obviate misapprehension, it may be well to state here the sense in which they are employed throughout this work. For the meaning of predisposition I refer to the text; by diathesis I understand the state of constitution in which multiplication of cancers occurs in the economy; by cachexia, the sum of general symptoms attending the disease.

clearly established the fact that influences, external to the individual, possess little or no power over the generation of cancer. They have shown, too, that the direct excitants of certain other diseases, I mean local injuries and irritations, play but an accidental and essentially subsidiary part in the production of this adventitious product. It is indubitable, on the one hand, that the various presumed extrinsic causes of chronic maladies may continue in action in many individuals for a length of time with every degree of intensity and in all possible modes of combination, without producing the slightest manifestation of cancerous disease; while it is equally certain, on the other, that carcinoma exercises its most fearful ravages on persons who have apparently never been influenced by any of those putative causes. In a word, all sound experience goes to prove that such influences may occasionally hasten the outburst of the morbid action or fix it in a particular spot, but never generate it. Hence the inevitable inference that individual *predisposition* (or, as I would prefer saying, *constitutional aptitude*) must be esteemed a necessary condition of the production of the disease,—that the existence of the latter involves that of the former.

But if, not contented with establishing the reality, we seek to investigate the nature of predisposition, we encounter insurmountable difficulties. It is true, a survey of the organic conditions of cancerous individuals, shows that a certain constitution derived from parents, sex, age, and mental affliction, modify the solids and fluids, to different amounts and with different degrees of frequency, in such wise as possibly to evolve the predisposition of which we strive to fathom the nature. But its essence, and its physical attributes, are not brought a whit nearer our grasp by the detection of these contributing influences. Some writers of repute are disposed to consider predisposition physically constituted by a particular state of the blood. Under existing circumstances, the opinion is purely hypothetical,—nor can the time be readily imagined, when a change antecedent both to actual cancerous vitiation and to the morbid crasis of the fluid I believe it necessary to admit as a harbinger of local manifestation of the disease (see p. 189) shall be made matter of demonstration.

A certain class of pathologists, among them M. Bouillaud, ridicule the idea of predisposition, because its nature is not understood, and because it is only known to exist by its presumed effects. But this is precisely the case with caloric, electricity, &c.; we know nothing of their nature, and recognise them only by their

effects: will M. Bouillaud therefore deny the existence of some power or agency, call it what he will, producing the results ascribed to them? Or to turn again to the phenomena of pathology, how otherwise than by the admission of predisposition will he explain the diversity of effects following identical causes? Upon what other supposition, for instance, will he plausibly account for the fact that the consequences of a blow on the spine may prove, according to circumstances, spinal irritation, hysteric or neuralgic pains, simple external abscess, inflammation of the bones with caries and necrosis, spinal meningitis, cancer of the vertebræ, cancer of the spinal meninges, fibrinous tumor of these membranes,* fibrous tumor, tuberculous deposit or formation of acephalocysts in the same situation, myelitis, hæmorrhage or cancer of the cord; — while in the great majority of instances the injury is followed by no single one of these various effects?

Attempts have been made to show that the predisposition may be limited to a single system; and in proof it is affirmed, that, in persons thus locally predisposed, an injury, which in other parts of the frame would produce no appreciable effect, will, in the predisposed system, be followed by cancerous formation. An illustration of the opinion (in which I cannot coincide) is found in the conversion of a blistered surface into a cancerous sore in individuals with carcinoma of the skin: but a similar occurrence has been noted, where no cutaneous disease pre-existed.†

§ V. *Cancer in the lower animals.*—I cannot conclude the subject of etiology without observing that, whatever be the causes of cancer, they are not limited to man; the disease affects certain of the lower animals to a considerable extent,—a strong collateral argument in favour of the reality of predisposition.

Camper taught that the lower animals were exempt from cancerous disease. Far from being thus distinguished from man, several animals are exceedingly prone to the affection; and the horse and dog, especially, suffer, according to the most experienced observers, in some organs even more frequently than the human subject. Having no experience of the disease in these animals myself, I shall limit my observations to a brief enumeration of the principal facts stated in the recent elaborate work of M. Heusinger.‡

* University College Museum, No. 2878.

† See, for example, in the Lancet, May 1845, a case of the kind, in which amputation of the limb was eventually performed.

‡ Recherches de Pathologie Comparée par C. F. Heusinger. Cahier deuxième, Cassel, 1844.

Cancer attacks the lips and the parotid gland of the horse, the œsophagus of the horse and the ox; both these animals are subject to the same disease in the stomach, intestines, and peritonæum,—the latter structure is said to be more frequently implicated in the lower animals generally than in man. Carcinoma of the testicle has been observed in dogs, horses, asses, and hogs; of the prostate in dogs; and the penis of the latter animals and of horses is more frequently thus affected than the human organ. The clitoris of mares is not an uncommon seat of the disease; and the dugs of several animals, more particularly of bitches, occasionally become carcinomatous. The brain even is sometimes thus diseased; and the external ear is said to be much more frequently affected in dogs than in human beings. The kidneys* become cancerous in the ox and dog.

Animals in a state of domestication are more prone to the disease than those neither tamed nor confined. Thus hens, pigeons, and domestic fowl generally, are said to be particularly prone to the disease. M. E. Rousseau† finds the disease not unfrequent at the Garden of Plants at Paris among the eagles, vultures, parrots of different kinds, and white bears.

Of the symptoms arising in animals in consequence of the development of scirrhus and encephaloid, the history remains to be established. It would appear that a state assimilable to the human cachexia has not been clearly traced.

SECTION IX.

DIAGNOSIS.

Were the general history only of cancer examined in this work, it would be here necessary for me to enter fully into the subject of its diagnosis. But so great is the diversity of effects produced by different species of cancer seated in different localities, that, however interesting a general survey of the distinctive characters of the disease might be, it could not prove of much real practical utility. It is therefore fortunate, that, while I shall have abundant opportunity in Part II. of entering into the special diagnosis of the disease in the various organs it infests, and of pointing out those particular characters which in each situation indicate its existence, I am in the present place spared the necessity of doing more

* Rayer, Maladies des Reins, tom. iii. p. 679. 1841.

† Tanchou, loc. cit.

than briefly enumerating the main grounds on which an opinion may be founded.

The general elements of diagnosis are furnished by the seat of the disease, the existence or absence of tumor, the physical characters of this (when situated so as to be made the subject of examination), the influence of the new formation on circumjacent parts, the condition of distant and apparently unconnected organs, the local symptoms, the kind and amount of mechanical obstruction of certain functions, the general symptoms and constitutional state, the course and duration of the disease, the age and sex of the patient, the various diseases he may have suffered under, and the existence or absence of family cancerous taint. Microscopical examination of discharges, expectorated and vomited matters, and fragments of morbid substance, should, wherever practicable, be undertaken; chemical examination of discharges will prove useful in some cases; and inoculation of the matter of sores of dubious character may, as a last resource, be sometimes adviseable.

SECTION X.

PROGNOSIS.

In establishing the prognosis of any disease, the first point to be settled is, whether the affection is necessarily mortal, or may terminate by recovery, occurring either spontaneously or under the influence of treatment. Now cancer is not, as a matter of absolute necessity, a fatal disease; but the number of recoveries, happening in either of the ways mentioned, is relatively so small, that practically speaking they are almost without numerical value, and may be excluded from consideration. Cancer being in this point of view classed with diseases inevitably ending, sooner or later, in death, its general prognosis depends wholly upon its mean duration, and may in particular instances be modified with various circumstances known by experience to influence that duration.

I have in a previous section considered the questions of the average duration of cancer, and of the amount to which its course may be shortened or lengthened by the species of the morbid formation and the age and sex of the patient. I have also shown (p. 142) that season is without influence in bringing to an abrupt close the career of cancerous persons. These points have been examined numerically, and evidence of the same kind will be found in Part II. in illustration of the influence of the seat of the disease on its

duration and prognosis. In what manner previous state of health, habits, social position, trade, and climate, may affect the duration of the disease, I have no numerical evidence to show,—and I conceive it useless to indulge in speculation. It has been averred that external cancers, distinctly originating after local injury, run a slower course than those of more purely constitutional origin: possibly this is true; but, if so, I have met with not a few exceptions to the rule. Cancers, seated in certain parts of the frame, may be removed by various surgical proceedings; in what manner the prognosis of the disease is affected by such removal, will be elsewhere* considered with the detail so serious a question requires.

These considerations apply to the disease in general. Our application of the result, derivable from them, to particular cases must be materially modified by the existing stage of progress of the new formation, by the amount of rapidity of its previous growth, by its tendency to affect circumjacent and distant parts, by the mode and amount to which it offers mechanical hindrance to the discharge of certain functions, by the existence or absence of intercurrent diseases, by the quantity of sanguineous and other discharges, by the amount and constancy of the pain endured and of the febrile reaction present, and above all perhaps by the condition of the general health, the degree to which the nutritive and other functions are affected by the presence of the morbid mass.

* Chapter VII. Section II. § IV.

CHAPTER VI.

AFFINITIES AND NATURE OF CANCER.

SECTION I.

AFFINITIES.

The affinities of cancerous growths require consideration both in respect of the relationship of the formations, so styled, to each other, and to morbid products of distinct kinds.

§ I. In order to simplify the study of their mode of alliance, I shall commence by exhibiting tabularly the points of dissimilitude traceable between the three species of cancer.

ENCEPHALOID.	SCIRRHUS.	COLLOID.
Resembles cerebral substance; the stromal character is moderately well defined.	Resembles somewhat the boiled rind of bacon; the stromal character is very imperfectly defined.	Has the appearance of particles of jelly inlaid in loculi; the stromal character is most clearly defined.
Is commonly opaque, from its earliest formation.	Has a semi-transparent glossiness.	The intra-locular matter is strikingly transparent.
Is of dead white colour.	Is of bluish-white, or lilac-yellow or fawn-colour.	Greenish-yellow is the predominant hue.
Contains a multitude of minute vessels.	Is comparatively ill supplied with vessels.	Its vessels have not been sufficiently examined as yet.
Is much less hard and dense than scirrhus.	Is exceedingly firm and dense.	The jelly-like *matter* is exceedingly soft; a colloid *mass* is, however, firm and resisting.
Frequently occurs in the nodular form.	More rarely assumes this form.	Does not occur in this form in parenchymatous organs.
Occasionally attains an enormous bulk.	Rarely acquires larger dimensions than an orange.	Observes a mean in this respect.

ENCEPHALOID.	SCIRRHUS.	COLLOID.
Contains a greater proportion of albumen, and a smaller one of inorganic salts, than scirrhus.	Is, for the converse reasons, less highly animalized than encephaloid.	
Endogenous development of cells is rare; proper fibrous substance exists to a very small amount.	Endogenous development of cells is rare; proper fibrous substance exists in abundance.	Exhibits cells encased within others, and grows habitually on the endogenous plan.
The loculi incline to the rounded form generally; but this is irregular and ill-defined.	The loculi incline to an irregularly rectangular form.	The sphericity of its component loculi is remarkable.
Is remarkable for its occasional vast rapidity of growth.	Ordinarily grows slowly.	Grows with a medium degree of rapidity.
Is frequently the seat of abundant interstitial hæmorrhage.	Interstitial hæmorrhage occurs rarely, and only on a small scale.	Hæmorrhage of this kind has not been observed.
Ulcerated encephaloid is frequently the seat of hæmorrhage, followed by rapid fungous development.	Scirrhous ulcers much less frequently give rise to hæmorrhage, and fungous growths (provided they retain the scirrhous character) are more slowly and less abundantly developed.	The course of colloid in this respect is unknown.
The progress of the disease after ulceration is commonly very rapid.	There is not such a remarkable change in the rate of progress of the disease after ulceration has set in.	The occurrence of abrasion of surface does not obviously hasten the progress of the disease.
Subcutaneous tumors are slow to contract adhesions with the skin.	Scirrhus thus situated becomes adherent.	Commonly becomes adherent to adjacent textures.
Is the most common form under which secondary cancer exhibits itself.	Secondary cancer is rarely of the scirrhous species.	No distinct example of secondary colloid cancer has yet been recorded.
Has been observed in almost every tissue of the body.	Its seat, as ascertained by observation, is somewhat more limited.	Has so far only been seen in a very limited number of parts.
Very commonly coexists in several parts or organs of the same subject.	Is not unusually solitary.	Has rarely been met with in more than one organ.

ENCEPHALOID.	SCIRRHUS.	COLLOID.
Is frequently found in the veins, connected with cancerous tumors.	Has not been distinctly detected in this situation.	Intra-venous cancer of the colloid species has never been seen.
When softened into a pulp, appears as a dead white or pink opaque matter, of creamy consistence.	Softens by infiltration with creamy matter, or by formation of buff-coloured opaque spots through its substance: does not distinctly acquire the cerebriform aspect.	Does not appear to undergo any change plainly referrible to internal softening.
Is more commonly surrounded by a pseudo-cyst than the other species.	Is very rarely thus separated from adjacent organs.	Does not become invested with a capsule, except in very rare cases.
Is not quite so disposed to spread by infiltration among adjacent tissues as the other two species.	The extension of scirrhus by infiltration of adjacent textures is a very constant occurrence.	Colloid very commonly invades adjacent parts by infiltration.
Affects a special preference for the testicle, lungs, kidneys, spleen, and meninges. (See p. 100.)	Is especially common in the uterus, female breast, stomach, lower lip and skin.	Infests the alimentary canal and omentum.
Is frequently attended with secondary growths.	Has a strong tendency to cause secondary development.	Is much less prone than the other species to give rise to secondary cancers.
The cancerous cachexia is not uncommonly ill marked.	Causes the most severe form of cachexia.	The constitutional suffering is least marked.
Is of shorter mean duration than the other species.	Is of longer mean duration than the other species.	Holds the middle place in this respect.
Is the species of cancer most frequently observed in infancy and youth.	Is uncommon before puberty, or even the thirtieth year.	Has so far been observed in adults only.

The number and variety of these distinctive characters, coupled with the absolute value of several among them, render the separation of these three adventitious formations, as distinct species, a matter of positive necessity. Closely as these formations are allied, I cannot (while such a formidable mass of argument against its accuracy, as has just been exhibited, lies before me) accept the

doctrine of some pathologists, who regard the three formations as being primarily one and the same structure.* The main arguments on which they ground their belief are as follow:—1. The three species are occasionally found co-existing in different organs in the same individual. 2. They are even met with in one and the same organ in close proximity. 3. After the ablation of a cancerous tumor, the reproduced growth frequently belongs to a different species from the original: thus encephaloid follows scirrhus; scirrhus more rarely encephaloid. 4. In the hard state encephaloid and scirrhus are not to be distinguished by their physical characters. 5. Structure possessing the appearance of scirrhus may soften into true cerebriform pulp.

The accuracy of the two first of these positions is incontestable; they clearly *point to* the intimate alliance of the products as a very probable fact, but, far from *demonstrating their identity*, they do not even *prove their alliance.* If these propositions were considered to have this force, it would follow as a matter of necessity that products wholly dissimilar (*e. g.* cancer and fibrous tumors) are intimately allied. The third argument unquestionably *proves* generic similarity; but cannot persuade me that things essentially different in several of their visible, structural, and vital attributes are originally identical. In respect of the fourth allegation, it must certainly be conceded that encephaloid, having the characters of the condition, which was termed "crude" by Laennec (p. 68), instead of being opaque and whitish, sometimes displays a slight degree of semi-transparent bluish tint, is extremely hard, and presents but little visible vascular development—properties approximating it to true scirrhus. Attempts have, however, been made by M. Trousseau and M. Rouzet to establish the distinction even under these circumstances. M. Trousseau points out that the grain of encephaloid is larger and less resisting than that of scirrhus, and that the former structure does not, as the latter, creak when divided with the scalpel: M. Rouzet observes that the surface of a section of encephaloid, instead of remaining plane, as is the case with scirrhus, springs into irregular elevations, and presents a number of mamillary prominences separated by depressed interstices. These observations are, as may very readily be ascertained, well-founded; but I agree with M. P. H. Bérard in thinking, that, when the characters in question appear in encephaloid,

* Dupuytren objected to Laennec's distinct description of "cerebriform degeneration," that this was, in fact, only the "third stage of carcinoma."—Journ. de Médecine de Corvisart, Leroux et Boyer, p. 441. An xiii. 1805.

that product is perfectly distinguishable at first glance from scirrhus. Still, admitting, as is the fact, that a specimen of hard carcinoma may be shown to an anatomist without his being able to determine whether the title of scirrhus or encephaloid be the more justly applicable, and admitting further (as I have in a previous chapter, p. 72, fully shown to be the truth) that the appearances induced by softening in the two species are more nearly similar than has been supposed and taught, still, I say, the inference that the two products are identical in essence is unwarrantable. The progress of micrology has shown that certain substances, considered identical by observers, who trusted to and were misled by physical characters visible with the naked eye, are in reality extremely different: a single instance of this—the long subsisting confusion of softened fibrin and pus—is a sufficient illustration.—Respecting the alleged softening of scirrhus into matter of encephaloid aspect, (the presumed occurrence of which, it is, however, to be observed, may in reality depend upon the inability to distinguish the products, while firm, by their outward characters,) I have already (p. 85) ventured on a hypothetical explanation, apparently less irreconcileable with facts, than that for which I desire to substitute it.

The elements for determining whether the properties of colloid justify its separation as a species, have been advanced in full. For my own part, I can entertain no doubt that, even without taking into consideration the marked peculiarity in the mode of development and growth of its microscopical elements, the position I have assigned this structure is a more just one than that given it by Otto, Recamier, and Carswell, as a mere variety of scirrhus, or by Dr. Hodgkin, who considers it "identical with, or bearing the closest relation to fungoid disease."

§ II. Such being determined to be the mode of relationship of the products to which the name cancer is applicable, it will next be advisable to inquire into the amount of affinity to these products possessed by various other adventitious structures. Considered as a mere question of morbid anatomy, it will be remembered that the property of infiltrating the tissues, amid which it is generated, distinguishes Cancer from other products of the order Growths, and constitutes it into a separate genus. My object in the present place will be to show to what extent this anatomical distinction is corroborated by various others.

I. *Non-infiltrating growths.*—(A.) *Compound cystoid tumors.*—Although it is not uncommon for writers to term compound cys-

toid tumors (such as form the usual anatomical character of the disease erroneously termed ovarian dropsy) malignant, yet almost all observers are agreed in regarding these structures as totally unconnected with cancer. M. Cruveilhier and Dr. Hodgkin do not acquiesce in the common opinion. The French observer unhesitatingly classes ovarian cysts with carcinoma, particularly with the colloid species, affirming that it differs from the ordinary form of this disease simply by the greater size of its meshes. But here is, obviously, vicious generalization: the general appearance of encysted masses is otherwise extremely distinct from that of colloid cancer; they have neither the regularity of form or arrangement in their loculi, nor the uniformity in the contents of these, so remarkable in the latter formation. Besides, as is well known, these ovarian cysts may acquire very considerable size without affecting the economy in the slightest degree except by the mechanical hindrance to the performance of certain functions: they possess neither the power of converting the adjoining tissues into their proper substance, nor of producing a particular form of cachexia; and M. Cruveilhier would be puzzled to find a case of encysted disease of the ovary attended with the local and general symptoms of cancer, unless deposition of encephaloid or scirrhus had taken place in the morbid structure. Besides, the mode of growth is perfectly different in the two formations. Further, M. C. is far from consistent; for, while he regards the septa of colloid as formed of the walls of dilated veins, he considers the primary loculi of encysted masses in the ovary as constituted by the vesicles of the part in a state of dilatation:* yet the two formations are declared to be identical. Again, I find in this author's classification of ovarian cysts a distinct class characterized by being developed on a cancerous basis: surely, if the multilocular cyst be itself a cancer, this is a most incomprehensible ground of distinction. Dr. Hodgkin on his part, assuming that the compound ovarian cyst is the type of cancerous structure, is obliged to include the two forms of disease in the same anatomical category; he considers that there is in fact "no appreciable difference either in the structure and arrangement of the cysts of gum cancer and encysted ovary, or in the composition of their contents." (Op. cit. p. 291.) Nevertheless he formally denies the "malignant" character of the compound ovarian cyst. Now he elsewhere (e. g. p. 268) distinctly makes

* This is the only fair inference from the article "Kystes" in the 5th Livraison; but in Livraison xxv. (art. Ovaire, p. 2,) he affirms that the areolar cysts of the ovary are seated in the venous erectile rete of that organ.

the presence of the cystoid arrangement a test of "malignity," but, as the disease of the ovary in question possesses this arrangement in the most palpable manner, it follows that it is "malignant:" hence the same formation is at once "malignant" and "non-malignant." For my own part, I have not the slightest difficulty in rejecting compound cysts from the genus Cancer: where pathology is made the co-groundwork of classification with anatomy, this could not be otherwise.

(B.) *Erectile growths.*—M. Cruveilhier, pushing to their extreme point his notions respecting the seat of carcinoma in the veins, affirms that in respect of structure *erectile tissue* and cancer are one and the same; that after the former has been freed from blood, and the latter from the cancerous juice, they cannot be distinguished from each other. In fact, to use his own words, "cancer is a varicose tissue, the meshes of which are filled with cancerous juice; varicose or venous erectile tissue, a cancerous structure, the meshes of which are filled with blood."* Hence the presence or absence of the cancerous juice constitutes the sole distinctive character of these formations. Now, elsewhere this author declares that the only difference between scirrhus and certain fibrous tumors is the characteristic juice of the former. The evil of fanciful generalization is here strikingly manifest; for it follows from these opinions, that, as fibrous and erectile tumors differ from the same by the same, they are themselves identical. The fact is that cancerous and erectile formations are allied simply and alone in such manner, as is signified by their both belonging to the order GROWTHS. Their constitutional and local influences are utterly different.

(C.) *Fibrous growths.*—Three opinions have found their advocates in respect of the constant or possible alliance of cancer and fibrous formations. (*a.*) It has been held that fibrous tumors are, *ex naturâ rerum*, incapable of undergoing "cancerous ulceration" or of "becoming cancerous." This is the opinion of Meckel, Bayle,† Laennec, Louis, Cruveilhier,‡ Lobstein,§ Sebastian,‖ R. Lee, Carswell, and others. Boivin and Dugès¶ never themselves saw such changes in fibrous growths, but believe that, as fibrous tumors are susceptible of inflammation, it would be unreasonable

* Op. cit. Livraison xxx. Veines, p. 3.

† Dict. des Sciences Médicales, tom. vii. p. 84.

‡ Essai sur l'Anat. Pathologique, tom. i, p. 387. 1816.

§ Anatomie Pathologique, tom. i. p. 335. 1829.

‖ See Krull, Diss. de Nat. et Caus. Tumor. Fibr. Uteri. p. 27. Gröningæ, 1836.

¶ Diseases of Uterus, Eng. Trans. by Hemming, p. 181.

to deny the possibility of such inflammation leading to deposition of scirrhus. (*b.*) Dupuytren taught that fibrous tumors pretty frequently undergo carcinomatous degeneration: the tumor inflames, softens, its external surface becomes uneven, knotty, frequently ulcerous; a fœtid ichor is discharged, and medullary substance, pus, or blood exhibit themselves. (*c.*) A third doctrine originates with Dr. Hodgkin. Presuming further on the infallibility of his test of "malignity," this observer affirms, that, in consequence of their "possessing the structure of compound adventitious cysts," there is inaccuracy and fallacy in applying the term "fibrous tumors" to the well-known bodies developed in the parenchyma or under the serous or mucous investitures of the uterus—that these are in truth "scirrhous malignant growths."* This opinion has received the support of Dr. Ashwell,† who, "must avow his conviction, after a careful and renewed examination of these tumors, that they are genuine cancerous productions."

The difference of opinion, just exhibited, has in great measure arisen from the extreme looseness with which the phrases "becoming cancerous," "taking on cancerous action," and similar expressions, have been applied by authors. That fibrous tumors are capable of becoming inflamed, of irritating the adjacent structures, giving rise under these circumstances to constitutional disturbance, running into a state of ulceration and even undergoing separation by a process of sloughing, followed by expulsion from the body,‡ is a fact as absolutely established as any position in pathology. But such changes neither signify the presence of cancer, nor suffice to assimilate the formation undergoing them to the cancerous class. The real evidence of becoming cancerous, that is, the development of encephaloid, scirrhus, or colloid, is infinitely more rarely afforded by fibrous growths, than by any natural vascularized tissue. I have never myself seen a particle of true carcinomatous substance in the interior of a fibrous tumor proper,—I have never met with any trustworthy person willing to prove he has done so, and I have searched periodical literature in vain for an authentic and convincing description of such an anatomical state. I should be jus-

* Guy's Reports, vol. i. p. 334.

† Treatise on Diseases peculiar to Women, vol. i. p. 289. 1840.

‡ The Museum of University College contains a preparation of a morbid mass discharged per vaginam after intense suffering; I found this substance to possess the microscopical characters of simple fibrous tumors. The patient, who had been seen by Sir James Clark, recovered perfectly. Not a very few similar cases have been put on record by other persons.

tified by past experience, then, in affirming that fibrous tumors never become truly cancerous, and should be borne out in the affirmation by the analogy afforded by natural fibrous structures; but I refrain from so sweeping a negation, because there is no established principle of morbid anatomy excluding the possibility of the occurrence: I am contented with displaying its extraordinary rarity.

The assertion of Dupuytren is easily explained. He obviously confounded the fungating and intractable sores, sometimes arising on the uterine surface and adjoining sub-mucous fibrous tumor, with cancerous ulceration,—applying the term, with a vagueness subversive of all accuracy in pathology, to every sore resisting treatment, and affecting the constitution by its discharge and irritative agency. As well might the fungating sore, produced in the tongue or cheek by a carious tooth, be styled a cancer.

The opinion professed by Dr. Hodgkin, that fibrous and scirrhous tumors are identical in nature—an opinion adopted by an eminent practical physician, Dr. Ashwell—might, it appears to me, be rejected at once from the deficiency of evidence supplied by its promulgators. But I conceive it will not be without practical utility to show, how completely irreconcileable such an opinion (whether it seek for its elements in anatomy, chemistry, physiology, or pathology) is with observed facts. With this view I shall exhibit in juxtaposition some of the characters of the two kinds of formation.

FIBROUS TUMORS.	SCIRRHOUS TUMORS.
Frequently attain enormous bulk.	Rarely, if ever, while simple and in the purely tuberous form, exceed an orange in size.
Naturally assume a globular shape, and are of even outline.	Have a tendency to flattened shape, and more or less uneven outline, when they have attained any size.
Frequently occur in some numbers in the same organ; rarely in several organs of the same individual.	Are commonly solitary.
A curvilinear and concentric arrangement predominates in the fibrous stroma.	The fibriform substance, which forms the stroma of scirrhus, is frequently arranged almost rectilinearly.
Submitted to pressure, do not yield a thin whitish fluid.	Submitted to pressure, yield a thin whitish fluid.
Are comparatively opaque.	Thin slices especially have a more or less transparent aspect.
Their essential microscopical element is fibres, having the strongest similarity to those of natural fibrous tissue: cells are not to be descried.	Their essential microscopical elements are cells and granules.

FIBROUS TUMORS.	SCIRRHOUS TUMORS.
Belong to the class of growths yielding gelatin.	Belong to the class of protein-growths.
Continuousness of their substance with surrounding structures is an accidental and rare condition.	The tendency to become continuous with and infiltrate surrounding tissues is one of their most strongly marked characters.
Frequently become the seat of calcareous ossiform-looking deposit.	I have never seen a specimen of true scirrhus, having ossiform-looking deposit in its interior (so-called "ossification"), unless when the tumor sprang from some part of the skeleton. And even this is, in the case of scirrhous cancer, excessively rare.
Unless when producing serious local irritative action (itself a consequence commonly of their mechanical influence on surrounding parts), they do not affect the constitution.	Produce deep constitutional effects *per se*, and independently of all mechanical influence.
Unless under the last-mentioned circumstances, do not become the seat of softening.	Undergo softening as an attribute of their existence.
If partially removed, reproduction takes place, but of precisely the same substance as the original mass.	If partially removed, reproduction follows, but most commonly of a different species of cancer—the encephaloid.
If a fibrous tumor be removed completely, development of similar growths in distant parts does not ensue.	If totally and completely removed, development of cancerous products in other localities does, in a large proportion of cases, occur.
Unless when the seat of irritative action and softening, they do not excite irritation in the communicating lymphatic system: this irritation is never of a specific character.	Excite irritation in the lymphatic system, before any obvious local irritative symptoms have set in: this irritation is of specific character, leading to development of substance in the glands, of the same genus as the original growth.
Rarely, if ever (and certainly with less frequency than any of the natural vascularized tissues), present in their interior or on their periphery, small or large masses of scirrhous, encephaloid or colloid cancer.	Frequently present, either on their interior or at their periphery, small or large masses of the two other species of cancer; commonly of encephaloid, more rarely of colloid.

(D.) *Enchondroma* possesses strong outward similarity to colloid cancer. The spherical form, the uniform size, the thinness of the walls, and the semi-transparent aspect of the contents of the loculi in each, approximate these formations in point of external characters. But the following distinctions exist. On a section of fully developed colloid cancer the walls of the loculi appear sharply

cut across at right angles with their plane; it is on the contrary extremely common to find the walls of the loculi of enchondroma exhibiting flat and extensive surfaces to the eye, as though the loculi had been opened to a small extent only. This probably depends upon a difference in amount of elasticity of the structure forming the walls in both growths. Colloid cancer does not originate in bone, which is the chosen seat of enchondroma. Enchondroma never infiltrates adjacent structures; colloid frequently does so affect them. Colloid never contains patches of bone, enchondroma does so almost invariably. Enchondroma yields chondrin, or in rare cases glutin; colloid furnishes no gelatin, and belongs to the protein-class of growths. Colloid affects the constitution *per se;* enchondroma simply (in the rare instances in which it ever does so) in the same manner as fibrous tumors.

The difficulty of distinguishing these products by mere outward physical characters is rendered obvious by facts already (p. 100) referred to.

Of the four species of growth now referred to, the compound cystoid and the erectile are the most nearly allied in nature to cancer, in so far as they not very uncommonly become the seat of cancerous formation. Erectile structures (nævus maternus, aneurism by anastomosis, &c.) are indeed particularly prone to form the nidus of encephaloid formation. Hence, no doubt, arose the confusion that long prevailed, particularly in France, in the application of Hey's term, fungus hæmatodes; it was indifferently used in speaking of fungating encephaloid and the morbid structure now referred to. By Dr. Hodgkin this striking feature in the pathology of adventitious erectile tissues is ascribed to their low vitality; by von Walther and Recamier to persistent irritation from internal and external causes: both notions are purely hypothetical.

II. *Common exudation-matter.*—I have already (p. 38) shown that scirrhus and common induration-matter fundamentally differ. But parts in a state of chronic induration are not exempt from the occurrence of cancerous infiltration. The inodular tissue of cicatrices following the removal of carcinoma, and, as it would appear from a few well authenticated facts, pseudo-membrane formed on the free surface of serous tissues, are likewise capable either of undergoing encephaloid infiltration, or of forming the basis, whence fungating growths of this character may spring.

III. *Deposits.*—(A.) *Colouring matters.*—(*a.*) *Melanic.*—After a patient examination of the conditions under which black pigment is deposited in connexion with solid formations, I feel myself jus-

tified in establishing the following points. This black colouring matter is found in structures of two kinds. In the one the structure belongs to formations of known and well ascertained characters, —*e. g.* the erectile, the fibrous, the cancerous: in the other the associated stroma is of peculiar character, but whether or not it is solely developed in connexion with black matter, I am unable to affirm. I have only met with this special form of stroma in the horse,—never in the human subject.

But another question is, whether "melanosis" or "melanoma," that is, accumulations, fluid or solid, having a black colour, are actually cancers. The affirmative has been held by Lorinser, Laennec,* Dupuytren, Alibert, Meckel,† Walther,‡ Cruveilhier, and Müller.§ I can have no hesitation in believing this opinion to be incorrect for the following reasons:—1. That the melanic pigment should in itself constitute cancer is an absurdity: it never even forms a stroma, as the cells continue permanently free. 2. The stroma of many melanic tumors is perfectly distinct in its physical, chemical, and microscopical characters from all cancerous stromata. 3. Many melanic tumors do not contain cancerous juice. 4. The microscopical characters of the pigment-cells and granules are the same in all kinds of growth in which they occur. 5. Melanic tumors, when no ordinary cancerous elements exist in them, cause no local or general symptoms, except those dependent on the size and seat of the growth. 6. When melanic tumors produce the local or general symptoms of cancer, they are found either to be composed of encephaloid or scirrhus, wholly or in part, impregnated with black pigment. 7. Neither the local nor general symptoms produced by carcinoma are modified in cases in which melanic matter is found to pervade it. 8. The circumstance that melanosis is rarely solitary, is strongly insisted on by Cruveilhier, as a ground for ranking it with cancer. But tubercle multiplies similarly, yet assuredly tubercle is not cancer.

(*b.*) *Yellow.*—I have already sufficiently referred (p. 82) to the tuberculous-looking aspect produced in some cancers when infiltrated with yellow colouring matter. To cancer thus discoloured Dr. Hodgkin would apply the name cirrhosis. But it is obvious that such application of this term would, in all probability, lead to most serious errors respecting the nature of that peculiar hepatic

* Bull. de la Soc. de Médecine, p. 24. 1826.

† Patholog. Anat. Bd. ii. Abtheil. ii. S. 295. 1818.

‡ In seinem und Gräfe's Journ. Bd. v. H. iv. 1814.

§ "Melanosis," says Müller, "is merely a variety of cancerous degeneration."

affection characterised by formation of simple plastic matter in certain situations of the organ,—an affection to which the title cirrhosis is habitually given in all countries.

(B.) *Tubercle.*—Not only does tubercle belong to a perfectly different order of adventitious products from cancer,—not only are these morbid substances widely different in their mode of development and growth, but they appear, as I formerly showed,* to possess a sort of repulsion in respect of each other. At least, in the first place, tubercle and cancer rarely co-exist. In one hundred and four narratives of the post-mortem examinations of adult persons cut off by cancer (narratives either my own or from intrinsic evidence trustworthy) I found but seven, in which the anatomical character of phthisis was present. The difference of the ages at which the two diseases are most prevalent, may to a certain extent, but unquestionably not altogether, explain this result. In five of the instances of co-existence referred to, the cancerous affection was of the scirrhous species; and the mean age of the patients at death, forty-one. The cases of encephaloid, seventy-two in number, furnished but two examples of tuberculous disease,—a fresh argument to add to the numerous other facts bearing testimony in the same direction, against the opinion of those who either consider encephaloid disease as allied to scrofulous, or, with Mr. Travers, actually regard it as cancer modified by a strumous constitution. Of the true cause of the tuberculous appearance of portions of encephaloid I have already (pp. 82, 83) spoken.

But a further opposition may be traced between these two products. The localities in which each is specially disposed to form, are those which the other distinctly eschews. Thus the uterus, the mamma, the stomach, the liver—organs which furnish about seven-eighths of the total sum of deaths caused by cancer (see p. 92)—are scarcely ever the seat even of secondary tuberculous deposit, and never in the adult become its primary site. Whereas the lungs are the invariable seat of tubercle, when the product infests the system of an adult person (Louis), those organs furnish but a contemptible fraction of examples of primary cancerous disease. The cæcal end of the ileum is the special intestinal seat of tubercle; that cancer ever forms in this part of the bowel has been denied, or at least questioned, by some persons.

Tuberculous disease has a special tendency to cause ulceration of the mucous membranes generally; M. Louis found ulcerations

* Cyclopæd. of Surgery, vol. i. p. 623. 1840.

in the ileum of five-sixths of persons dying of phthisis. Now, unless from cancerous formation having occurred in the intestine itself, or in the immediate neighbourhood in such manner as to affect the bowel by its close proximity, ulceration of the mucous membrane is infinitely rare in cases of cancer. I have never seen it, and have met with but two satisfactory examples of its existence recorded by others.

In the tuberculous constitution, demonstrable *physico-chemical* alteration of the blood has been shown by M. Andral to be developed from the outset, and to form in part the essence of the disease; similar alteration occurs in cancer, but secondarily and accidentally only (see p. 115).

IV. *Parasitical animals.*—Not only is cancer totally different in nature from hydatids (p. 36); but, as may be gathered from what has been elsewhere (p. 84) said, the two kinds of formation rarely co-exist.

V. *Corroding ulcers.*—The connexion of the state, termed corroding ulceration, with cancerous destruction, will be considered when I am engaged in describing those parts in which the former has been chiefly observed.*

SECTION II.

NATURE.

The practical problem to be solved respecting the nature of cancer is,—upon what depends its destructive character? Before offering a few conjectures on this question, one or two preliminary points must be noticed.

§ I. Much contradictory matter has been written on the question whether "malignity" is inherent in and peculiar to carcinoma, or accidental and capable of being developed under various conditions and in various adventitious structures. The disputation on the subject has mainly arisen from the variety of meanings attached to the term. How, in truth, can uniformity of opinion be expected to subsist on the point, when notions so incompatible as the following have found, and still find, their partisans? One class of persons designates as "malignity" the sum of the properties possessed by cancerous formations. Another uses the word as a synonym of incurability. "Malignant, by which term I mean

* Part II. Chapter VI. Section Uterus; Chapter IX. Section Skin.

incurable," says Mr. Travers; at least a plain and intelligible statement, amplified by others into the obscure phrase,—"a malignant disease is one in which the destructive action overbalances the restorative." It will be seen that, according to Mr. Travers's definition, the most innocuous fibrous, lipomatous, and enchondromatous tumors, as well as the tubercle of phthisis, are all "malignant." A third notion originates with Dr. Hodgkin; this writer applies the term to growths in which the anatomical appearance referred by him to cystiform arrangement (meaning, as already shown, p. 66, the locular character) prevails. The simple but fatal objection to this notion is, that colloid, the least destructive species of cancer, is that exhibiting the character in question in the most decisive manner;—nay more, the growth, which displays it in a more marked form than any other known adventitious product, is that very one proved by experience to be especially free from destructive tendency and influence, namely enchondroma. A fourth class of persons (forming the great majority of writers) attach a sinister but vague meaning to the word, which they are totally unable to define. And grave authors of this class actually fractionize the unknown quantity, and discourse concerning *semi-malignity!*

I feel convinced that both scientific and practical pathology would gain, were the use of this term, perpetuating as it does serious misapprehensions, altogether relinquished. Better far to acknowledge our inability to assign a precise species and name to a given growth, than, in styling it (by a mere verbal subterfuge) "malignant," deceive ourselves into the belief that we have surmounted the difficulty. Still it may be as well to observe here, that if the word be understood as signifying the power of a morbid growth at once to infiltrate, and cause atrophous destruction of, the natural tissues, to produce similar disease in distant parts, to reappear after destruction and give rise to a peculiar cachexia, it can be justly applied to cancer alone. If the microscopical composition of adventitious growths be urged as an argument against this statement, if it be said that different properties cannot appertain *ab origine* to growths which are identical in the nature of their elementary constituents, I must refer the objector to what has been already said respecting the original nature of morbid blastemata (p. 50), and to the refutation elsewhere given (p. 63) of Müller's doctrine of homologousness. Even Müller himself (and I mention him both as the suggestor of this doctrine, and as the observer who gave the existing impetus to the micrological study of new for-

mations) admits that there are characters by which "malignant" may be distinguished from "benignant" growths, but they are only appreciable by the naked eye or with a lens, and lost under the microscope,—an opinion in which I perfectly coincide. In fact, *in the present state of knowledge*, chemical and microscopical examination would (while they indubitably in many cases aid greatly in distinguishing growths of different properties and tendencies) often lead us, on the other hand, into the error of confounding growths perfectly dissimilar in nature and effects. But the question is a clinical one; are individuals destroyed with the symptoms and manifestations of cancerous disease, in whose frame neither scirrhus, encephaloid, nor colloid are to be found? Never, I confidently affirm. Compound cystoid and erectile formations sometimes apparently produce such effects; but, when this has been the case, post-mortem examination discovers those products to have been the seat of carcinomatous development.

§ II. The question, whether cancer is originally a local or a general disease, has probably given rise to more zealous disputation than any of the knotty points connected with its history. A set inquiry into the matter is not necessary here, for the simple reason that the history of the disease, as given in previous pages, settles the point conclusively. The physiology, general pathology, and etiology of cancer, as well as the nature and extent of influence producible upon the disease by treatment, give almost the certainty of mathematical demonstration to the following proposition: —*A cancerous tumor under all circumstances, even should it remain single and stationary for years, is but the local evidence of a general vitiation of the system.* It may, I am aware, be inquired, is not this a contradiction?—how is it possible that, if the organism at large be in a state of disease, a single spot of that organism shall alone manifest its presence? And I confess my inability to explain away the difficulty; but neither the fact of its existence nor its inexplicability can shake the solidity of an inference deduced from incontrovertible facts. All pathologists, who have carefully investigated the history of tuberculous disease, admit that local agencies, of whatever kind they may be, can never cause the production of a particle of tubercle—that constitutional derangement must lead the way. Now here we have precisely the same difficulty to contend with—a knot of tubercles may exist for years at the summit of a lung, and every other organ remain free to the last from the disease. Why this is so, we know not: these are the mysteries of pathology, and they are mysteries which it would,

in the actual state of knowledge, be a bootless task to seek to fathom.

§ III. To return now to our starting-point, upon what depends the baneful and destructive character of cancerous disease?

It has been fully seen that cancer is, in respect of its anatomical and physiological characters, distinguished from all other morbid formations by its faculty of destroying by infiltration the natural structures, amid which it is generated. It is this quality which gives it a place apart in the scheme of Adventitious Products. Now, considered abstractedly, there seems nothing very terrible in this property; so clearly is this the fact, that, it appears to me, we must look elsewhere for an explanation of the evils practically connected with infiltration, than to the mere physical phenomenon itself,—in a word, we must seek elsewhere some condition, of which the process is but a consequence or involution. But the natural place to look for this condition is in the tissues themselves, which undergo infiltration; and in these—in some special morbid change within them—must reside the source and origin of the process. And this view is confirmed by the fact, that there is nothing in the mode of vegetation of cancer itself to explain, why it alone among vegetating new formations should possess the power of infiltrating the natural tissues.

This point settled, the following is the view which, I conceive, may be taken of the nature and sequence of the phenomena of the disease. A certain constitutional state exists, and may continue to exist for a variable period without giving functional evidence of its presence, although the blood and solids of the body are specially modified.* In consequence of local injury, or otherwise, exudation takes place; upon that exudation the constitutional state has impressed special attributes and tendencies (p. 50),—among these attributes ranks an intrinsic power of vegetation. This vegetating faculty of the exudation re-acts on the system by constantly draining it of a portion of its nutrient materials,—the progeny feeds upon the parent organism, and the first phasis of evolution is accomplished. But the natural tissues have been so modified in properties by the constitutional state, that they are incapable of resist-

* It may appear a strong objection to the admission of any such *primary* modification of the blood, that micro-chemical enquiries have hitherto failed to demonstrate it. The objection would indeed be fatal to the theory, were our means of investigation sufficiently perfect to justify us in affirming that where an alteration is not found, none exists. But so long as the fact continues otherwise, the refutation of any such objection is obvious and easy on the grounds of experience and analogy.

ing the encroachments of the vegetating exudation, and hence become the seat of atrophous, ulcerative, and other modes of destruction. Discharges of various kinds now still further drain the system of its fluids, and impair its vital energies; and the second phasis is established. Meanwhile secondary alteration of the blood is effected; this fluid becomes the vehicle for the circulation through the system of elements possessed of a germinating force,—these stagnate, are deposited, and new local vegetations spring into life and activity. The same series of phenomena is again and again gone through; until the system, drained of its reparative fluids in feeding exudations and supplying discharges, exhausted of almost every drop of pure blood through the influence of secondary cancerous impregnation, paralysed in its nervous energies by physical anguish and deficiency of pabulum, sinks in the struggle against the superior powers of the new existences it has created,—and in death is closed the third phasis of the disease.

Hence it would follow, that some special state of the natural solid tissues forms a most essential element of cancerous disease,—that the tumor or tumors are, if I may so speak, but an accident of the malady, and a sort of local agent in evolving it to its final term, —and that, lastly, in a peculiar constitutional state (the nature of which cannot at the present day be even divined) reside the *fons et origo* of the disease. To these conclusions I have been led not without the most earnest reflection; novel and conjectural as they are in some points, they yet seem to me so strictly involved by the premises, that I cannot help indulging the belief that time and experience will confirm them.

CHAPTER VII.

TREATMENT OF CANCER.

SECTION I.

PROPHYLACTIC TREATMENT.

The notion of a prophylactic or preventive treatment of cancer involves the possibility of recognising the tendency to the disease before the actual formation of carcinomatous matter. Now, in the present state of knowledge, such recognition, as has already been seen, is a matter of impossibility. In the absence of positive indications, however, dubious ones may fairly be acted upon. Thus, should a depraved state of health, inexplicable by the condition of the different organs, commence to exhibit itself in persons springing from a cancerous father or mother, or having collateral relatives afflicted with the disease, measures should be taken without delay to effect, as far as possible, alteration in the constitution of the fluids and invigoration of the general health of such individuals. Those hygienic rules which experience has found most efficacious, in respect of diet, exercise, and mental occupation, should at once be put in force. It will be advisable to submit a threatened sufferer to an alterative course of medicine (non-mercurial), and the best mode of administering this is by the medium of mineral waters at their sources. The change of climate, and of habits, and the removal of mental disquietude ensured by occasional visits to Continental watering-places, has a powerful effect upon the general well-being of persons who have fallen into a bad state of health. Such patients often appear, to use a frequent expression of their own, "to have taken a new lease of life." It is matter of fair inference that in individuals presumptively prone to cancerous disease, the special change of the blood, which appears to constitute its primary morbid element, might, as well as other depraved conditions of the fluid, be warded off by these alterative measures.

A mother, whose relatives have suffered from cancerous diseases, ought not to suckle her children. A vigorous nurse of healthy

family should be selected for the purpose,* and, as has been recommended in the case of scrofulous children, lactation continued for a year or fifteen months. From the hour of birth the object, in the instance of infants belonging to a cancerous family, should be to secure the *mens sana in corpore sano ;* with this view a well-regulated system of diet, nutritious but not stimulating, with full exercise, should be enforced. The child should inhabit well-sunned and well-ventilated rooms, and be provided with means of in-door exercise when the state of the weather confines him to the house. Gymnastic exercises, under judicious direction, are after the age of nine or ten to be strongly recommended. In the early years of life some sacrifice must be made of intellectual to corporeal improvement ; confinement to the close air of school-rooms for a considerable number of hours daily cannot do otherwise than exercise a pernicious influence on the health of a child, whose constitution is, in the manner supposed, vitiated by hereditary influence.

The ordinary considerations in respect of general healthfulness, which serve to guide parents in the selection of a profession for their sons, should have their due weight in cancerous families. But there is one circumstance to be especially borne in mind, and of more importance than all others in such families,—I mean the avoidance of a profession the active and serious exercise of which entails more or less constant care and anxiety. The importance of this consideration appears from what I have said on the influence of mental suffering in generating the disease. For this reason, the professions of the Bar, Medicine, and Diplomacy should be avoided. The speculations in which merchants, bankers, stock-brokers, &c. are so prone to indulge, ought, if these occupations be embraced, to be systematically shunned for the same obvious motives. All things considered, the professions of the Army, Navy, and the Church, unless there be some special objection, offer the best chances of escape from the disease to individuals predisposed to cancer. Females should not become governesses.

Particular organs may have their special prophylaxis. The connexion of cancer of the penis with congenital phymosis is established with sufficient certainty to justify early circumcision in individuals, thus conformed, belonging to a cancerous family. Again,

* One of the modes in which the microscope has proved useful in respect of practical medicine is in disclosing distinctive peculiarities in breast-milk of different qualities,—peculiarities which will guide the physician correctly in the choice of a nurse, when the common methods of selection fail. The inquiries of MM. Donné and Devergie on this subject are of great interest.

as certain morbid formations (*e. g.* erectile and compound cystoid growths) exhibit more than an average amount of liability to become cancerous, (I mean, through the development of scirrhus or encephaloid in their substance,) the removal of the former may be looked upon as prophylactic against the latter.

SECTION II.

CURATIVE TREATMENT.

In examining the effects of the various modes of treatment proposed for the cure of cancer, I shall suffer no pre-acquired notion of the nature of the disease to influence my conclusions. I shall follow the results of observation solely, carefully avoiding the extremes into which writers of two opposite classes have fallen,—that of being swayed by a dominant impression either of the utter incurability, or the ready curability of the affection. What can be more opposed to experience than the doctrine of M. Bouillaud, for example, who sees no difficulty in the way of curing cancer, because cancer is merely an inflammatory induration; or, again, than the figment of M. Breschet, who, guided by the speculations of Bichat, traces the disease to an aberration of "organic sensibility," and is persuaded we may readily manage this imaginary existence? And, on the other hand, can a greater perversion of the first principles of logic exist than that displayed by observers, who, profoundly impressed with the frequent failure of all methods of cure, assume as their device the constant intractability of the disease; and when eventually obliged to admit that growths, recognised as cancers, do occasionally disappear under the influence of remedies, have recourse to the plea, that the disease was in such instances not really cancerous, *because it was* cured?

I have in a previous place (p. 134) fully described the processes by which a spontaneous cure of the disease is occasionally effected.

§ I. Internal Remedies.—I. Narcotics.—Numerous medicines belonging to this class have been employed with variable degrees of success.

Conium.—It would appear that conium was had recourse to at a very early period in the treatment of cancer; still, the notice it has attracted within the last century is unquestionably due to the statements of Störck. Recommended by him in 1761 as an almost infallible remedy, its reputation has fallen and risen alternately till

the present time; nor can its true claims perhaps be considered, even at this moment, definitively settled.

Störck employed the extract, and, commencing by doses of one grain, increased the quantity until it produced a slight degree of poisonous effect. The very palpable exaggeration of this experimentalist concerning its curative powers was soon made notorious by the inquiries of various observers throughout Europe; especially, perhaps, by those of Andree* in this country, and of De Haen (who, it is to be observed, wrote with obvious personal animosity towards Störck) and Alibert† abroad. Notwithstanding this, M. Recamier has of late years employed the medicine extensively, and affirms that several cases of internal and external cancer have yielded under its influence. He limits the patient, while taking it, to one-third of the ordinary quantity of food; and directs the use of the decoction of sarsaparilla after each dose of the medicine, and as a substitute for water at meals. M. Recamier administers the extract, and ascribes his success in some measure to the following mode of preparing it: the plant is exposed to the vapours of vinegar or alcohol before expression; and the juice heated in a sand-bath and evaporated to the ordinary consistence.‡ On the other hand, the conclusion drawn by Bayle from an impartial review of the statements of others and from his own experience is, that conium never cures cancerous disease, but occasionally retards its progress and alleviates pain. MM. Marjolin and Pauly are of opinion that its only action consists in destroying the digestive powers and producing headache.

Truth, as might be presumed, lies between the extreme opinions of the last-named authors and M. Recamier; and Bayle's inference may be said to be that of the profession generally at the present day. Still, it is impossible to read the narratives of numerous cases

* Observations upon a Treatise on the Virtues of Hemlock in the cure of Cancer, written by Dr. Störck. By John Andree, M.D. London, 1761.

† Nouveaux Elémens de Thérapeutique, tom. i. p. 425.

‡ Nothing can be more obvious than that the mode of preparation must exercise great influence on the strength of the drug. Orfila states that he once swallowed a drachm of the extract, without feeling any effect; whereas about a third of that quantity would have proved fatal, had the drug been of the proper strength. Mason Good speaks of a lady who, having been in the habit of taking sixty grains of the powder with impunity, was nearly poisoned by twenty of a new sample.—Study of Medicine, vol. ii. p. 588, ed. 4. It is also to be remembered, that the amount of poisonous (and hence of medicinal) power of conium varies with the climate in which the plant grows. It is more poisonous in the South of Europe than in Great Britain, and so inert in Russia that the boors eat it with impunity.

on record without receiving an impression that the disease may be permanently arrested in its advance, and *pro tanto* cured, by the long-sustained use of conium, administered in doses increased progressively to such an extent as to produce some of its poisonous effects. Dr. A. L. J. Bayle,* in his learned summary of recorded experience on the subject, finds that, of 341 cases of cancer treated with conium, 46 were cured, 28 benefited, and in 267 instances the drug failed to produce any beneficial effect. Some of the cases of recovery may not, as the writer grants, have been truly cancerous; but it scarcely seems possible to affirm that none of them were so.

It is difficult to persuade patients to persevere in the use of the medicine sufficiently long; and I must confess, that the only benefit I have myself effected by its administration, in the uncombined state, has been alleviation of pain and irritability,—especially in cases of cancer of the stomach. I have increased the dose to ten grains of the extract (well prepared) taken twice daily; even this quantity cannot be used without causing uncomfortable symptoms.† The quantities said to have been given by some practitioners are enormous: Dease‡ ascribes the cure of the disease in one instance to the exhibition of an ounce and a half of the powder every twenty-four hours; Rostard§ gave six drachms of the extract daily!

Belladonna.—Some cases are to be found in which cure is alleged to have followed the use of belladonna.‖ The evidence of the cancerous nature of the disease is almost invariably deficient in these instances; and I have no experience myself of the medicine in the affection. Nevertheless, I can refer to at least one case well worthy of consideration, related by van der Block.¶ A woman, aged fifty-one, was delivered completely of a tumor, possessing all the characters of scirrhus, by the use of infusion of belladonna, Lambergen's plaster (containing the extract of the same plant) being at the same time kept applied to the surface. In twelve months the affected breast had become precisely like its fellow, and after the expiration of two years the woman was seen in a perfect

* Bibliothèque de Thérapeutique. 1829.

† Dupré de Lisle (quoted by M. Tanchou) says, that the milk of goats fed on hemlock is the best anti-cancerous remedy in cases where the disease is of external origin.

‡ Theory and Practice of Surgery.

§ Journal de Médecine, tom. xxxviii. p. 36.

‖ Alberti, de Belladonn. tanquam specific. in Cancro. Halæ, 1839.

¶ Journal de Vandermonde, tom. xiv. p. 108.

state of health. Darluc, Amoreux, Marteau de Grandvilliers, Campardon and Cullen testify to the remedial value of the medicine.

Aconite, *hyoscyamus*, *laurus-cerasus*, and *stramonium*, although spoken favourably of, have little claim to notice, except as mere sedatives. *Mezereon*, employed with alleged success by Everard Home, has completely fallen into disuse.

Hydrocyanic acid has been employed, and may be doubtless useful as a sedative, but is utterly devoid of specific action in this disease. Still, the cure of uterine cancer has actually been ascribed to its use.

Digitalis has been theoretically supposed capable of diminishing the bulk of cancerous growths by controuling the circulation; but there are no cases to be found, so far as I am aware, in which the drug has ever been tried to an extent justifying an opinion in either direction.* Nor does it appear entitled to such trial.

Sedum acre.—This plant, of which there are several species, (possessed, according to botanists, of similar properties,) was originally spoken of by Stramer and Marquet for its supposed special virtues in cases of cancer. Linnæus and Vogel entertained similar opinions of its efficacy; but Buchoz† may be considered to have particularly introduced it to general notice. Lombard of Strasburg has related several cures obtained by its use, and M. Tanchou collected twelve from different sources. I cannot, however, regard any of these as satisfactory. M. Tanchou, after some experience of the effects of sedum acre, concludes that, applied externally, it does not beneficially modify ulcerated surfaces, and that taken internally (in daily doses increasing from about two grains to fifteen) it often determines disagreeable symptoms, which render its suspension necessary. When borne, it has appeared to quiet nervous irritation, but nothing more.

II. Antacids.—The notion that cancer contained an acid, led to the employment of alkalis both volatile and fixed. "The cure of cancer," in the language of Alliot,‡ "consists in the mortification of acids by alkalis and absorbents." Martinet§ and Barbette speak enthusiastically of the effects of *ammonia;* and the former especially relates cases showing, that, even in the most advanced condition of ulceration, much benefit may be derived from the local application and internal administration of the volatile alkali. For external use

* Richter, Chir. Bibliotek. B. iv. S. 591.

† Médecine Pratique, tom. iii. p. 148. 1785.

‡ Traité du Cancer, p. 126, 1698.

§ Observ. Médico-Chimiques sur le Cancer. Paris, 1781.

he employed a solution in the proportion of half an ounce of strong liquor ammoniæ to a pint of water, placing compresses saturated with this fluid twice daily on the part; and at the same time directed four or five drops of ammonia to be taken daily in water.

Lime-water was supposed to exercise a specific influence on cancer by Vogel;* the *hydrosulphuret of ammonia* was recommended by Burns.

III. Tonics.—Preparations of *iron*, originally brought into notice by Justamond and De Marre, owe the celebrity they at one time obtained as curative and palliative agents in this affection to the writings of Mr. Carmichael. This eminent practitioner particularly recommended the subphospate, but also exhibited the phosphate and biphosphate, carbonate, and tartrate internally. The external use of these salts is combined with the internal; if the disease be in the ulcerated stage, they are applied in the form of a paste made with water; if not, a lotion, consisting of a strong solution of some one of them, is kept constantly applied to the part. I am not aware whether Mr. Carmichael still retains his high opinion of the efficacy of iron; but certain it is that both he and several other practitioners, both in this country and on the Continent, have obtained results from its administration that entitle it strongly to notice. There are doubtless no cases actually proving a cure of the disease; but numbers, in which local relief, and especially general improvement of health, followed its use, may be found in authors.

Various preparations were, it appears, employed by Mr. Carmichael. Among these the biphosphate was found a most valuable remedy by M. Fuzet-Dupouget. This practitioner having administered the salt in three cases of ulcerated cancer, in which the cachexia was prominently marked, found pain and fetor removed, the aspect of the ulcers improved, and the appetite and sleep restored. Death eventually occurred in all three cases, but without any of the intense suffering usually entailed by cancer. Denman had particular confidence in the *ammoniuret*.† Dr. A. T. Thomson has of late years introduced into practice the *iodide* of this metal, and there can be no question in my mind as to the special appropriateness of this salt in certain cases of cancer. I mean, in cases where a state of anæmia, whether directly produced by hæmorrhage or otherwise, points to the utility

* De Curat. Canc. per aquam calcis vivæ, &c. Gött. 1769.

† Observations on the cure of Cancer, p. 77.

and even necessity of administering ferruginous preparations. The syrup of the iodide (originally prepared by Squire, and containing three grains of the salt to a drachm of vehicle) is the best form in which this medicine can be given; if well prepared, it will not only be borne without increasing febrile action, whether existing rapidity of pulse be actually febrile or merely anæmic, but will distinctly lower the irritable excitement of the system. I have, it is true, had comparatively few opportunities of observing this in cases of cancer; but I have repeatedly witnessed, and pointed out to others, these effects in phthisical patients.

Gold.—Various preparations of gold (non-officinal in this country) have, in France, been employed, both internally and externally, in the treatment of cancer. Duportail* relates a case of cancerous ulcer of the face, reaching to the bones, which healed under the use of the preparations of gold in the following manner. The gums were rubbed daily with the auro-terchloride of sodium; oxide of gold given internally with hyoscyamus and conium; the ulcer was besides cleaned daily with laudanum, powdered with cinchona and camphor, and dressed with an ointment containing oxide of gold. The treatment was sufficiently complicated; but the cicatrization was perfect, and, as it appears, permanent. M. Duparcque speaks highly of the terchloride of gold in union with antiphlogistics and conium.†

Copper.—The salts of copper (especially the diacetate) taken internally and applied externally in various forms, have been said by Lieb, Gerbier, Gamet, and von Mittag, to have effected a certain number of cures. Solier de la Romillais,‡ directed in 1778 by the Faculty of Paris to make trial of the remedy, reported, that "of eight patients, one was cured, two greatly relieved, while the disease persisted in its previous state in the others." The medicine has fallen into disuse, and there seems to be scarcely any fair motive for returning to its employment.

Chloride of Barium.—This salt was originally recommended in cancerous diseases by Crawford,§ but the strongest testimony in its favour is that of von Mittag; ‖ I cannot say much for the evidence they have collected.

* Journal Général de Médecine, tom. xl. p. 289. The author was a Professor of the Faculty of Montpellier.

† The formulæ for the preparation of these salts are given in the French Codex.

‡ Séance Publique de la Fac. de Méd. de Paris. 1779.

§ Duncan's Med. Commentaries, vol. xiv. p. 433.

‖ Mémoire sur le Cancer.

IV. Alteratives.—*Mercury.*—Mr. Burns holds* that mercury never cures, and often exasperates the disease; Bierchen maintains that it hastens the softening and ulceration of the tumor; Reidlin regards its employment as directly pernicious. Of the accuracy of these opinions, especially in respect of doses of the mineral exhibited with the special view of affecting the gums, no doubt can, it appears to me, be entertained. Nevertheless contradictory testimony on this point is to be found. Strange to say, in France, where calomel is so sparingly employed, the exhibition of this salt in combination with conium has been strongly recommended by MM. Gama and Bégin. These practitioners, commencing by very minute doses, gradually increase the quantity until salivation, *or* a state of continued purgation is established. There are few medicines, according to M. Bégin, which more frequently realize the hopes of the practitioner. General and local antiphlogistic treatment with emollient or narcotic local applications, and, if practicable, compression, are enforced at the same time. The latter clause is important, and in my mind accounts for the beneficial effects presumed to be produced by mercury.

General opinion is more favourably disposed towards the exhibition of mercurial preparations (especially the bichloride) in minutely alterative doses combined with certain other remedies. Akenside upheld the claims of the bichloride, in combination with conium and cinchona, as a most efficacious remedy. Gooch, Gmelin,† Büchner,‡ and many others, might be quoted to similar effect. The most recent writer on this side of the question, M. Tanchou, fancies he has found both the chloride and bichloride, in extremely small doses, powerful agents in suspending the progress and mitigating the pain of cancerous growths. He employs the mineral externally also. But in answer to these pleadings it may be observed, simply, that accurate narratives of cases demonstrating the alleged efficacy of mercury are yet a desideratum.

Iodine.—Hopes of an extravagant kind were excited, shortly after the discovery of iodine, concerning the powers of this substance over cancerous tumors. These hopes maintained their ground for some time, but have now given place to a state of total scepticism as to the value of the remedy. A middle opinion is that which careful observation and inquiry justify; when, more especially, the external application of the remedy has been had

* Principles of Surgery, vol. i. p. 350.

† Method. Cancrum sanandi. Tübing. 1756.

‡ De Med. Mercur. usu in Cancro. Halæ, 1755.

recourse to in conjunction with the internal, beneficial effects have unquestionably ensued.

Wagner,* Hirsch and Klaproth†, relate cases which cannot be declared insignificant, unless by persons whose preconceived opinions pervert their judgment. Ullmann has employed the iodide of potassium with very beneficial results even in cases of most advanced cancer; Magendie pronounces it to have been successful in his hands in the cure of cancer of the tongue; and the mass of evidence on the subject leads M. Littré, who is anything but disposed to take exaggerated views of the powers of drugs, to deduce a favourable inference as to the efficacy of this salt. Dr. Copland states that in two females, aged between thirty and forty, and affected with supposed scirrhous tumor, (there were lancinating pains, and the nipple and axillary glands were diseased, in both instances,) "perfect recovery" took place after a course of ioduretted iodide of potassium, conium, and subcarbonate of potass. Dr. Copland qualifies this account by expressing a doubt whether the tumors were actually carcinomatous; certain it is, they had withstood other means of cure for a long time. M. Friese de Goldapp‡ relates the case of a lady, aged forty-five, in whose right breast a tumor had acquired the size of the clenched hand; it was excessively hard, nodulated on the surface; the skin, thin and bluish, adhered to the mass, and a chain of indurations reached to the axilla. The patient refused to submit to the operation, and was consequently put upon a course of iodide of potassium internally, while an ointment of the same basis was rubbed in. At the end of six months the scirrhus was completely cured; the patient having taken about thirteen ounces of the ioduret during that period.

I shall reserve for another place the statement of the conclusion to which my own experience has led me concerning these preparations; but I must observe here, that the testimony of persons, who find the iodide of potassium is not *borne* by patients, cannot be regarded as otherwise than valueless. The iodide of potassium, if taken, in conjunction with some mucilaginous fluid, about an hour and a half after meals, is invariably well supported, unless there be disease of the alimentary canal.

Arsenic.—Arsenical preparations appear to have been employed from the earliest antiquity in the treatment of cancer; but from the period of its recommendation in the tenth or eleventh century

* Revue Médicale, Juin 1823. † Hufeland's Journal, 1823.
‡ Journal des Connaiss. Méd.-Chirurg. Sept. 1842.

by a monk named Theodoric, may be dated the regular introduction of *arsenious acid* into practice. In respect of the efficacy of this medicine, as of others, opinions are divided. On the one hand appear the assertions of an experienced Swedish practitioner, Roennow,* who after fifty years' employment of it had succeeded in curing thirty cases of well-marked cancer,—the persuasion of Justamond, who esteemed it a specific,—and the confidence of numerous practitioners of the last century in its powers. On the other, experiments on an extensive scale, conducted in Germany, France, and in this country, might lead us to question its power in curing any form of the disease. Mr. G. N. Hill, however, states as the result of his experience that this substance retards the progress of the complaint, often prevents scirrhus from passing into the ulcerative stage,† and sometimes apparently dissipates such tumors completely. Dr. Copland believes that when this medicine is cautiously employed, both internally and externally, in conjunction with narcotics and alkalis, or otherwise judiciously combined, Mr. Hill's opinion in its favour is not much too highly coloured.

The least reflection upon the nature of cancer must lead to the conclusion that the more powerfully alterative a medicine is, the greater the chance *cæteris paribus* of its proving beneficial in that disease. This is an *à priori* argument in favour of *a trial* of arsenical preparations by no means to be disdained; and it of course possesses additional force, if these can be combined with any other alterative of a powerful character. Now, in the *iodide of arsenic* these conditions are realised. Dr. A. T. Thomson, who introduced the medicine, supplied the earliest evidence‡ of its favourable influence in cases of cancer: this evidence, though not altogether convincing in respect of the solvent powers of the remedy, was of such a kind as to dispose me strongly to give it a trial under favourable circumstances. I have since done so in several cases, from which (in the greater number, other but not equally energetic means, were employed simultaneously) I feel myself justified in drawing the following inferences as to its effects. It is to be premised, that in all these cases the species of cancer treated was scirrhus in the non-ulcerated stage, that the breast was the part affected, and that the constitution had in some begun to suffer seriously. 1. Given in doses of one-sixteenth to one-twelfth of a grain twice daily, two hours after eating, the iodide of arsenic is

* Méd. de l'Acad. de Stockholm. 1778.

† Ed. Med. Surg. Journ. vol. vi. p. 58. 1810.

‡ Lancet, Oct. 27, 1838; see also Crane, Lancet, Aug 31, 1839.

well borne, and may be continued without risk for several months. 2. The system generally soon gives evidence of its action,—unusual perspirations with dryness of the fauces and alimentary canal occur. Sometimes slight headache is complained of, but this is rare; and I have known most violent periodical headache, which had afflicted a lady for years, disappear while she was under the influence of the salt. 3. The pain of the tumor decreases in violence. 4. The size of the breast generally diminishes; and, if the tumor itself does not actually lessen in bulk, I have at least found that its enlargement, previously more or less active and apparent, becomes, as far as can be determined, suspended. There is difficulty in establishing the fact, on account of the change in dimensions of the breast generally. 5. The general health improves.

My experience does not enable me to make any affirmation as to the power which this medicine, unaided, may by possibility possess of causing the removal of scirrhous tumors; one reason of this being, that I have invariably, after a short trial of it alone, associated external agents in the treatment with it.

V. Animal Substances.—*Animal charcoal* in doses of half a grain, by degrees increased to four grains, twice daily, has been spoken highly of by Weise.* His favourable announcements have not been confirmed.

Cod-liver and *skate-liver oils.*—M. Vingtrinier† has employed these oils (especially that of the skate, which contains more iodine, and is less nauseous than the other,) successfully in certain mammary tumors of suspicious character. M. Tanchou has also employed the former substance in cases of well-characterised cancer, and with results, as he states, which show it to be worthy of more extended trial. I have no experience of cod-liver oil in cancer; but I know it to be a powerful medicinal agent, and would therefore agree with M. Tanchou in recommending it to be fairly judged.‡

The *flesh of the grey lizard* (lacerta agilis) originally prescribed by a Mexican physican named Florès, in 1781, was found by Fontana§ to contain a large proportion of alkaline salts, was sup-

* Ueber die Zurückbildung der Scirrhen und Polypen. Leipzig, 1829.

† De l'Emploi Médical de l'huile de foie de Morue et de Raie. Rouen, 1843.

‡ After a tolerably extensive use of cod-liver oil at the Consumption and University College Hospitals, I feel justified in affirming, that it exercises a marked beneficial influence in cases of tuberculous disease (especially of the bronchial glands) in children, in external scrofulous diseases, and in various eruptions of the head,—certain porrigos, impetigo and chronic eczema. Excellent oil is sold by Walton, of 283 Wapping, at an extremely moderate price.

§ Journal de Vandermonde. Aug. 1787.

posed by him to owe its alleged anti-cancerous properties to these, and under this view administered by him in the dry state. Cases of reported cure by this substance are on record in some number; but I refer to it simply from its connexion with the alkaline system of treatment already spoken of. Bayle states that a patient of his, affected with a cancerous tumor in the face, swallowed upwards of four hundred grey lizards in the course of two months without obvious effect of any kind.

§ II. External Remedies.—The external remedies, or modes of treatment which have been employed for the cure or relief of cancer, may be considered under several different heads, according to the particular manner in which they are presumed to act.

(*a.*) *Means which lower the nutrition of the part.*—1. *Application of leeches.*—The idea of diminishing the size of external cancerous growths by repeated leeching is of very early date. Valsalva energetically lauded this method of treatment, and Fearon, persuaded of the inflammatory nature of the disease, trusted to it almost wholly; venesection being substituted when an internal organ suffered. Modern experience has established the degree of utility of local abstraction of blood. In the *very earliest* stages of diseased induration one or two applications of leeches are advisable, even as a guide to the diagnosis of tumors of doubtful character. Should inflammatory symptoms accidentally arise in the adjacent textures, these too may be combated by leeching. But I fully coincide in opinion with Mr. Burns,* that "the obstinate and senseless reiteration of leeching can only tend to weaken the patient, and sooner break up the constitution."

When local depletion is justifiable in the manner described, the number of leeches applied must be regulated by the size of the tumor; it should vary between twelve and eight; a smaller number causes an afflux of fluids to the part without emptying the vessels sufficiently. When a tumor is adherent to the skin, the practice becomes perfectly inadmissible; the bites have frequently been known to pass into permanent ulcerations, as they have also done in the case of the cervix uteri. M. Bégin, whose confidence in the powers of local depletion would be more encouraging were it not for his belief in the inflammatory nature of the disease, applies leeches even to ulcerated surfaces,—a proceeding not to be imitated.

(2.) *Ligature of nutrient arteries.*—Harvey † appears to have

* Op. cit. vol. i. p. 351.

† On Generation, Eng. edition, p. 113. 1653; quoted by Soden in Med. Gazette, Dec. 8, 1843.

successfully treated a tumor of the scrotum by tying the spermatic artery. H. Weinhold* records a case in which ligature of the same artery reduced a diseased mass in the testicle very considerably in bulk. Mr. Lucas† made trial of the practice of tying the chief artery leading to cancerous parts, so early as 1814, but not with very encouraging results. In 1820, Maunoir ‡ earnestly advised the plan in the treatment of sarcocele. Considering the matter *à priori*, it would seem that, unless in situations receiving their blood from a single source, the anastomotic supplies must soon undo what has been done by the operation. Yet Dupuytren, believing that erectile tissue always exists in smaller or larger proportion in encephaloid tumors, (an indubitable error, as has already been shown,) practised ligature of the principal artery, when he conceived the cancerous matter had a very small share in the composition of the foreign growth. M. Magendie § states that he tied the carotid with the effect of permanently stopping the growth of an enormous scirrho-encephaloid tumor on the side of the head and face, which had twice been reproduced after partial ablation. M. Jobert has recently modified this method, adding to the ligature of the principal vessels that of the nervous filaments connected with the cancer. He has thus cured, he informs us, four ulcerated cancers of the lips, and one of the tongue. ‖ I find also in the American edition of the article "Cancer," (p. 158,) an account by Dr. Mason Warren, of a case of "scirrhus" of the parotid gland occurring in a woman aged fifty-five, treated by ligature of the carotid artery by Dr. Hosack. The tumor was of considerable size, of three or four years' growth, interfered considerably with the motions of the jaws, and had caused closure of the external meatus; the patient had been treated with iodine internally and externally for two months without the slightest benefit. Disappearance of the tumor followed the ligature of the vessel; and not only this, but, according to Dr. Hosack, a depression eventually formed in the situation, "in form precisely like that of the gland in its natural state, thereby showing its complete removal, together with that of the disease." In another similar case Dr. Hosack succeeded by the same measure in arresting the growth of the tumor, and relieving the sufferings of the patient.

* Hufeland und Himly's Journ. der Pract. Heilkunde, St. x. S. 112. 1812.

† Cooper, Surg. Essays, Part i. p. 184. 1818.

‡ Nouv. Méthode de traiter le Sarcocèle. 1820.

§ Phén. Physiques de la Vie, tom. i. p. 119.

‖ British and Foreign Medical Review, vol. ix. p. 260. 1840.

(*b.*) *Means calculated to promote absorption.*—1. *Dry friction.*—Pouteau advised the employment of simple dry friction of the surface of the part; but it is scarcely necessary to say that no shadow of confidence can be placed in the method, which has fallen into total disuse.*

(2.) *Blisters.*—Mr. Burns (Op. cit. vol. i. p. 352) is of opinion that blisters applied directly over a cancerous tumor in the earliest stage may promote its absorption. The remedy is, at the least, a hazardous one, which I should not be disposed to adopt.

(3.) *Electricity and galvanism* have been directed against cancerous formations, in consequence of an account, published by Dr. Easton, respecting a lady who having been struck with lightning found herself soon after freed from a scirrhous tumor which had resisted a variety of modes of treatment. Experiments were made with these agents by Brisbane† and von Walther,‡ but not with results justifying any conviction of their efficacy. Mr. Carpue§ states, that he has succeeded by sparks and shocks in the cure of scirrhous testicle in two or three cases, and makes no question of the correctness of many narratives on record of scirrhous breasts being cured by electricity. He has, however, himself, after numerous trials, been successful in one case only; and, as in this instance the patient was aged only twenty, reasonable doubts may be entertained of the cancerous nature of the induration.

(4.) *Mercurial inunction and plasters.*—I know nothing by experience of applications of this class; but strong encomiums of their effects are to be found.

(5.) *Preparations of lead.*—The power of causing the resolution of scirrhous tumors, ascribed by Goulard and Brambilla to certain saturnine lotions and ointments, is sufficiently well known at the present day to have been imaginary, to render it unnecessary for me to enter into a refutation of their ideas. Of the combination of lead and iodine I shall presently speak.

(6.) *Preparations of iodine.*—"That the external use of *iodine*, in the form of ointment, sometimes completely removes tumors pos-

* Suckling toads was a popular remedy about half a century ago in our own country in cases of mammary cancer,—at least, if we may judge from one of the private letters of Junius to Woodfall, who, alluding to the Princess Dowager of Wales, at that time afflicted with a cancer, that destroyed her in 1772, mentions that "she suckles toads from morning till night."—Mason Good.

† Select Cases, p. 36.

‡ Ueber die Ther. Ind. der Galv. Oper. c. 12.

§ An Introduction to Electricity and Galvanism, p. 50. 1803.

sessing the characters of scirrhus, (where it has been had recourse to at an early stage of their development,) is a fact of which we have witnessed some examples. The truly cancerous nature of such growths may of course be questioned; yet a trial of iodine externally, provided the part be indolent, and its use excite no irritative action, is certainly advisable: the length of the trial should be regulated by the apparent influence produced on the tumor." Since I wrote these words in 1840, my confidence in the powers of iodine-friction, especially when combined with the use of the iodide of arsenic internally, has increased. Nor does my present experience allow me to conceive a single doubt that tumors, actually and truly scirrhous in structure,—tumors which would have run the common course of cancer,—may be arrested in their progress by *early* and judicious use of these agents. Nor is similar testimony wanting from others. Mr. G. N. Hill's* cases afford very decisive evidence to the same effect, and Dr. Ashwell's statements on the subject (see Cancer of the Uterus) are strongly encouraging. The convictions of Mr. Travers on the point are stated† with peculiar emphasis. "By an indolent scirrhus," says this writer, "I mean an incompressible permanent tumor, possessing for many years no distinguishing character of that disease; but in a deranged state of health assuming its genuine character, and at a particular period of life breaking up into an actual cancer. I do not entertain a doubt that such a tumor *may be, and often is, absorbed in its first stage, and need not therefore of necessity follow this course.* I feel assured that most of the hard breasts of young and middle-aged women admit of being reduced by the iodine or the mercurial ointment, if early resorted to, and steadily persevered in, *having often succeeded in procuring their absorption by such means, when, from the characters they presented, I should otherwise have felt compelled to urge their removal by operation. . . . . Nothing is more certain than the susceptibility of absorption in many such tumors at an early stage of their existence.*"

The preparation of iodine used is not a matter of indifference. That ordinarily employed, a combination of iodide of potassium, iodine and lard, almost invariably produces a degree of cutaneous irritation, which makes it necessary to intermit its use frequently, and sometimes give it up altogether. The iodide of lead ointment (composed of a drachm of the salt and an ounce of lard) is not only completely free from this inconvenience, but has appeared to

* Ed. Med. Surg. Journ. vol. xxv. p. 282. 1826.

† Med. Chir. Trans. vol. xvii. p. 306. 1832.

me more actively promotive of absorption. The ointment should be smeared in very gently, twice daily, for several minutes at a time.

(7.) *Dry pulverulent applications.*—M. Tanchou (Op. citat. p. 231) insists upon the utility of applying various of the discutient and resolvent substances I have now referred to, in the dry form in *sachets*, according to a plan which has always had its partizans in Germany in the treatment of numerous affections. The apparatus used for their application consists of a piece of oiled skin (to prevent evaporation, maintain a warm humid state of the skin, and prevent injury to the patient's dress),—of a layer of wadding powdered with the material to be employed, and lastly of a piece of fine gauze to prevent the latter from falling off. Every description of medicinal powder may be applied in this way, except such as attract moisture either from the air or skin, and are thereby decomposed. The materials used require renewal every eight or ten days. Those employed by M. Tanchou are conium, camphor, iodine, lime, tartarized antimony, calomel, sesquioxide of iron, belladonna, digitalis, &c. When too strong in the simple state, these various substances may be mixed with different proportions of fecula, starch, chalk, saw-dust, lycopodium, or any other inert powder.

Several cases are given, showing that very distinct amelioration of at least tolerable duration may be obtained in all stages of cancerous disease by the use of pulverulent matters; and it is unquestionably a point of practical utility to be enabled to change the form, as well as the nature, of local applications in a malady so protracted as cancer,—but it does not appear that any of these substances are capable of producing effects of a more powerful kind, when in dry powder, than in the other conditions in which they are habitually employed.

(*c.*) *Means calculated at once to lower nutrition and promote absorption. — Compression.* — In the year 1809 Mr. Samuel Young* conceived and acted upon the idea that the continued nutrition of scirrhous tumors might be completely prevented, and the absorption of existing substance ensured, by submitting them to methodic compression. The results of the practice, as made public by himself, have been condensed as follows by Dr. A. L. J. Bayle.† The number of cases given is nineteen; of these, seventeen relate to cancer of the breast, two to ulcers of the cheek and upper lip. Twelve cases terminated by cure; five were considerably benefited; the

* Minutes of cases of cancer successfully treated. By S. Young. 2nd edition, Lond. 1816.

† Bibliothèque de Thérapeutique, tom. iv. p. 202. 1837.

two cutaneous ulcers improved somewhat. The majority of the tumors were hard, irregular, tuberculated, and the seat of lancinating pain; six of them were ulcerated, and discharged ichorous pus. Even in the worst cases the tumor diminished in size, but the patients fell victims to the diathesis.

In consequence of Mr. Young's announcements, the plan was tried at the Middlesex Hospital, and a committee appointed to report upon the results. The conclusion of the report, drawn up by Sir Charles Bell, was, that compression could not be regarded as a "specific" cure, and had no claims to notice *except for its power of alleviating pain.* But, as was justly rejoined by Mr. Young, much of the want of success described may have arisen from defective management of the plan; no details of the cases are given. The spirit, in which Sir Charles Bell judged, may be inferred from the allusion to the mode of treatment as a specific, — a character with which Mr. Young never sought in the remotest degree to invest it; it would in truth be just as wise, observes the latter, to speak of the pad of a hernial truss as a specific against strangulation, as to assign the character to compression in cancer.

The testimony of Mr. Travers (loc. cit. p. 306) is favourable to the practice. He has known tumors, such as those already described (p. 206), "gradually reduced, and at length absorbed by equal and persevering compression, as by strips of soap and adhesive plaster, or, what is better, by an elastic roller passed many times round the chest, with layers of the Amadou smoothly interposed between the turns of the roller." M. Recamier has employed compression upon a very large scale, and the more important part of his results is as follows: "Of one hundred cancerous patients, sixteen appeared to be incurable, and underwent only a palliative treatment: thirty were completely cured by compression alone, and twenty-one derived considerable benefit from it: fifteen were radically cured by extirpation alone, or chiefly by extirpation and pressure combined, and six by compression and cauterisation: in the twelve remaining cases the disease resisted all the means employed." MM. Blizard and Masson* have published three cases, and M. Carron du Villards† three others,—in all of which irregularly nodular scirrhi, the seats of lancinating pain, &c., were removed by compression. Dr. A. L. J. Bayle (loc. cit.) gives, as the general results in 127 recorded cases, 71 cures, 26 instances of improvement, 30 of total failure. These results, the most favourable on the whole that

* Bibliothèque de Thérapeutique, loc. cit.

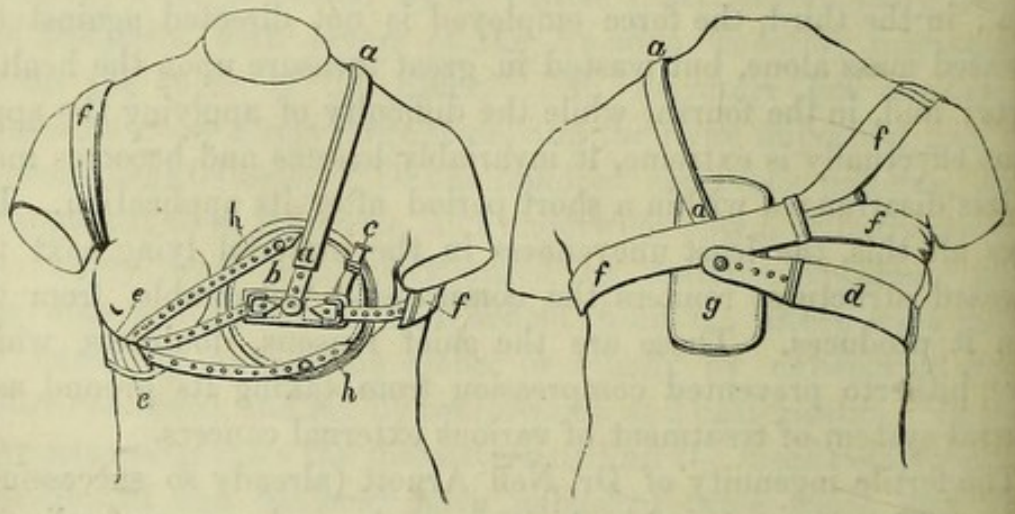
† Bulletin Thérapeutique, tom. v. p. 244.

can be adduced in favour of any mode of treatment, bear scrutiny of the severest kind. It is no doubt true, that, in some of the cases alleged to be cancerous, neither of the anatomical species of that affection existed; but it is on the other hand perfectly unquestionable that many of the absorbed growths were not only actually scirrhous, but had already become the seat of ulceration, when submitted to compression.

Difference of opinion has existed as to the best mode of applying compression. M. Recamier employs perfectly smooth disks of agaric, laid over each other, and retained *in situ* by a roller, as the compressing materials. M. Bégin sometimes substitutes a laminated plate of lead, modelled to the tumor, and surmounted with a pyramid of graduated compresses. This application (which is far from a novel one) frequently becomes painful, and cannot be endured. M. R. recommends a renewal of the apparatus every day, or every second day: M. Bégin thinks it better to change only when the bandages grow loose; and prefers, in consequence of this view, an elastic corset, capable of accommodating itself to the decreasing size of the part, as the compressing agent, wherever circumstances admit of its use. But all contrivances of these kinds are ineffectual, for various reasons: in the first place, they exercise unequal and irregular pressure on the tumor; in the second, they confine the movements of the chest to a degree varying with the amount of constriction; in the third, the force employed is not directed against the diseased mass alone, but wasted in great measure upon the healthy parts; and, in the fourth, while the difficulty of applying the apparatus effectually is extreme, it invariably loosens and becomes more or less disarranged within a short period after its application. Besides all this, the least unevenness in the material lying next the diseased structures renders the compression unbearable, from the pain it produces. These are the chief reasons, doubtless, which have hitherto prevented compression from taking its ground as a general system of treatment of various external cancers.

The fertile ingenuity of Dr. Neil Arnott (already so successfully and so variously employed in devising mechanical means of relieving human suffering) has triumphed over these difficulties. Dr. Arnott has invented a method of applying compression, which, while it is free from all the objections mentioned, is philosophical in principle, and possessed of peculiar practical excellences. His apparatus consists of a spring, an air-cushion supported by a flat resisting frame or shield, a pad, and two belts. The spring, which is of steel, is the compressing agent,—its strength being varied with the amount of

pressure it may be desirable to obtain. The shield, varying in shape somewhat with the circumstances of particular cases, is generally slightly convex on the external surface, of circular or oval outline, and formed of a rim of strong wire, connected at two opposite points by a flat piece of iron, which serves for the support of the spring, screws, &c., the whole being covered with jean. To the rim of this shield is sewn a sort of conical cap of soft linen, designed to receive the air-cushion, to keep it *constantly slack*, and prevent it from slipping about when applied. The air-cushion thus kept slack, fashioned into a sort of double night-cap, lying in apposition with the inner surface of the shield, and sufficiently filled with air to prevent the latter from pressing directly on the part, receives within it the tumor to be compressed. One end of the spring is attached by screws to the external surface of the frame, and the other end to a solid but soft pad, placed wherever the counter-pressure is to be made. The straps are used to keep the apparatus steadily fixed. Let us suppose that the breast is the region to which the instrument is to be applied; the positions of its various parts will appear, as they are represented in the subjoined figures. The spring may either be passed over the shoulder, or round the waist;—the latter mode of application suits best, when



The slack air-cushion applied to the breast: front and back views.—(aa.) The spring passing over the shoulder, and fixed in front to the centre point of the shield (b), and in the back to the back-pad g.—(b.) The shield, receiving on a screw at its centre point the spring (a), where also is attached a double buckle for straps; round the border of the rim appears an edge (h) of the air-cushion.—(c.) The stop-cock for inflating the air-cushion.—(d.) A belt fixed to the centre point of the pad (g) behind, passing round underneath the healthy breast, and fixed in front by leather straps to the buckle attached to the shield, and also to studs at two opposite points of the circumference of the latter.—(e.) A soft moveable pad attached to the inner surface of that part of the belt (d), which lies below the healthy breast.—(f.) A second belt passing under the arm of the unaffected side by a shoulder strap, carried behind, and fixed to the buckle in front of the frame.—(g.) The counter pressure pad.—(h.) Border of the air-cushion, as before explained. [In order to understand the mode of application of the waist-spring, it is only necessary to suppose a belt substituted for the spring (a), and a spring fixed to the pad (g), passed round the waist in the direction of, and lying outside the belt (d).]

the tumor is seated towards the external border of the breast, and inclined to slip towards the axilla.

The mechanical advantages of this mode of compression are, that the movements of the thorax are not interfered with; that the amount of pressure may be regulated to a nicety; that the whole morbid mass undergoes constant, equable, and uniform pressure; that the part is protected from external injury (a point of serious importance); and that, unless in a very few exceptional cases, the apparatus may (either with the shoulder or waist-spring) be very easily arranged. It is necessary that the amount of pressure should be low at first (say 2lbs.), especially in the cases of nervous, irritable people, — in fact, that the instrument should rather supply a support for, than exercise pressure on, the part; that the entire morbid structure (as well as any connected loose soft parts, which might be injured by accidental pressure of the rim of the shield,) should be included within the cushion; and that in all cases there be a distinct thickness of air-cushion between the shield and the skin.

The effects produced by pressure are removal of existing adhesions, total cessation of pain, disappearance of swelling in the communicating lymphatic glands, gradual reduction of bulky masses to small, hard, flat patches or rounded nodules (which appear to be, both locally and generally, perfectly innocuous), and in the most favourable cases total removal of the morbid production. The relief of pain afforded by the instrument is, without exaggeration, almost marvellous; this effect is insured by the peculiar softness and other properties of the air-cushion, the medium through which the pressure of the spring is transmitted to the surface. Females unable to obtain sleep even from enormous doses of laudanum, cease instantaneously to suffer on its application; and sleep thenceforth, as though they were perfectly free from the disease.

There are certain conditions which either interfere altogether with the use of the instrument, or reduce it to a merely palliative agent. These conditions are, more particularly, excessive bulk of the new growth, and such localizations of this structure as place any portion of it beyond the reach of pressure. Persons of irritable skin and temperament, and prone to become œdematous or anasarcous, are with some difficulty manageable. Less is to be expected in cases of encephaloid cancer than of the other species, and in cases of infiltrated than of tuberous accumulation. If the morbid mass be extensively softened, ulcerated, or in a state of fungous vegetation, palliation is all that can be fairly hoped for. Adhesion to

the skin is of untoward influence. As a means of controlling and averting hæmorrhage, the slack air-cushion pressure is of high utility.

Pressure, on Dr. Arnott's system, is applicable to cancerous tumors in every situation where a bony or other solid support exists behind the growth, and where a point for counter-pressure can be had. The mamma, the limbs, the surface of the thorax or cranium generally, are the seats in which the mode of treatment is most readily applicable. I see no reason why cancer of the testicle might not be treated thus, — and gentle pressure on this plan deserves a trial in certain cases of cancer of internal parts (it would surely relieve pain), provided the general functional relations of those parts do not interfere (and they will often not do so) with the adoption of such pressure.

The system of pressure now described, useful as it is independently of all other treatment, may be rendered more efficacious by the association of other external means and internal remedies. The following case exemplifies the power of such combinations.

I was requested (*March 3rd*, 1843) by Mr. Langley to see a lady, affected with scirrhus of the breast, which it was proposed to remove with the knife.—The patient has been married nineteen years; has had no children, nor miscarriages; hair abundant and jet-black; eyes dark hazel; skin brunette, without the least trace of straw colour; temperament nervo-sanguineous; capillary system of cheeks and lips highly developed; skin of medium quality; venous system rather full. She is thin, but scarcely more so than at any period of her life; catamenia generally regular, abundant (lasting five or six days), habitually painful, but less so within the last few months than formerly; occasional leucorrhœa, but not to any great amount; never any cerebral symptoms, but very commonly violent hemicrania at catamenial period; has never had pulmonary symptoms of any kind, or palpitation; is not subject to cutaneous eruption; had a slight attack of Asiatic cholera at the time of the epidemic.

Present State.—Appetite tolerable, not decreased of late; no dyspeptic symptoms; bowels habitually confined; does not suffer from thirst; pulse 88 (but she is excited and nervous now), regular in force and rhythm; heart small and healthy. Exactly five months and a half ago was attracted by slight pain to the right breast, and found there a lump about the size of a small hazel-nut, not tender to the touch, unattended with soreness or discoloration of the skin; it increased but little in size till the last six weeks, within which time it has enlarged to its present bulk; suffers scarcely any pain in the tumor itself, but has lancinating pain above the nipple in the indurated part of the gland to be presently described. In its general outline the right breast is double as large as the left (it has always been somewhat the fuller of the two); the subcutaneous veins more visible than on the opposite side; at the axillary border of the gland is an excessively hard, solid, defined, rather moveable tumor; the finger may almost be slipped behind this, but

at its inner edge it is continuous with another indurated mass, obviously a portion of the mammary gland itself in a state of infiltration; the tumor is finely knotted on the surface, the infiltrated part somewhat more largely so; besides this, the substance of the gland is indurated and knotty, especially above the nipple; the nipple is less prominent than on the healthy side, but is not actually drawn in; the areola is unaffected; there are no adhesions of the skin or alterations of its texture; no enlarged glands in the axilla, but slight thickening and hardening of some of the absorbent vessels leading thither; no discharge of blood ever from the nipple; when the tumor examined, not painful, but a short while after became so. Measurements: — whole breast $4\frac{3}{4}$ inches broad, $3\frac{1}{4}$ inches vertically; tumor $1\frac{3}{4}$ inches broad, $1\frac{1}{2}$ inches vertically. The soft parts about are flaccid and yielding. — I recommended the following pill: R. Arsenici ioduret. gr.j. extract. conii ℈ij. in pill. xvj. dividend: j. bis die s. Light nutritious diet; moderate walking exercise. *March* 8.—Applied the slack air-cushion (diameter of bag, $6\frac{1}{4}$ inches; pressure of spring, $3\frac{1}{4}$ pounds); the whole mass of the breast included, except about half an inch at the left superior angle, where merely cellular tissue. No annoyance of any kind experienced by the patient, except slight impediment to respiration, which ceased in a few minutes. *March* 10.—Pain totally removed; size of general mass of breast somewhat diminished, but the tumor is only rendered more prominent and apparent by this. No inconvenience is experienced from the instrument except in the back; the patient being thin, the pad presses uncomfortably on the spine. *March* 12.—Tumor appears very distinctly reduced in bulk, more elastic, less stony in feel, less pointedly knotty on surface, less sharply defined: all these changes are to a very small amount, but they are nevertheless positive. Catamenia for last two days. *March* 30.—Tumor (which has been gradually decreasing) is now scarcely more than half the original size; some slight indication of absorbents with tenderness of the skin, and slight redness; nothing in axilla; (instrument much disturbed yesterday in the carriage, and edge pressing against skin).

From this period until the middle of August the progress of things was slow and interrupted; twice, at the menstrual period, the tumor enlarged slightly, without however becoming painful. I gradually increased the force of the spring (which had always been carried over the shoulder) to six pounds, and diminished the diameter of the bag to $3\frac{1}{2}$ inches,—by which a great increase of pressure was obtained; and, at the date named, the tumor was about one third only of its original size, had become freely moveable under the skin, and the general knottiness and hardness of the gland had almost disappeared: patient has lost altogether the headaches which used to torment her. I now lost sight of the patient (first through my own, and then her absence from town) till the middle of November. During all this period the instrument had been more or less neglected, and not applied at all for the last month; the use of the pills had also been interrupted. *November* 23, 1843.—The tumor is now at least half as large again as when I first saw it; it is more painful than ever, and has reacquired all its original characters,—it is, however, still non-adherent. I reapplied the cushion, of the diameter first used, and within a week a favourable change had taken place; the tumor continued thenceforth to diminish in size, until it was reduced to the size of a hazel-nut. This little nodule appearing immoveable, I (at the close of January, 1844) directed the iodide of lead ointment to be smeared on the part twice daily, the pressure being at the same time con-

tinued. The effect was almost immediate,— so much so that the patient, after the lapse of a fortnight, requested to be allowed to use the inunction without the pressure: the impulse to absorption had been given; the tumor steadily decreased in size, and had totally disappeared at the close of April, 1844. I have within the last few days (August, 1845) examined the breast, and found it in every respect like its fellow, *without a vestige of tumor or induration of any kind.*

Here, then, was a tumor, which (though it had so far not given rise to any of the more terrible evils appertaining to cancer) yet possessed in the clearest and best defined manner the sum of characters assigned by universal experience to growths pursuing the common course of that disease; and this tumor disappeared completely under the persevering use of the means described. Had the growth been removed with the knife, the chances (as will fully appear in the sequel) are extremely strong that, within the present period, the disease would have re-appeared, and, perhaps, destroyed its victim. But from the very perfection of success in this and similar cases an objection may arise in some minds. It may be urged, that, as in such cases a mass, composed of indefinitely vegetating cells, is removed from its original site by absorption, the displaced cells may in some new abode germinate and flourish. But the objection is a fallacious one. The absorption effected in such cases must on physiological grounds be considered of the kind I have termed *unproductive* (see p. 105); and clinical experience, so far as it has yet gone, corroborates, in the non-reproduction of tumors thus dispersed, the justness of the physiological principle. The question of spontaneous absorption (see pp. 110, 134) is, in this point of view, somewhat a different one. (See Cancer of Breast.)

(*d.*) *Means designed to prevent extension of the disease and promote absorption.*—*Subcutaneous incisions* have been performed with this view by M. Tanchou (Op. cit. p. 226) in the spots where the vessels and nerves pass, and through the substance of tumors themselves. It is imagined that, when cut up into pieces, these morbid masses would prove more amenable to the powers of absorption. All rational experience would lead me to regard this notion as utterly groundless; nor can the shadow of a sound argument be adduced in favour of the conception that by dividing the "bands" extending from a cancerous growth (another alleged object in the operation), the extension of the disease would be prevented. The experimental result at which M. Tanchou has arrived is, that such incisions in cases of mammary tumor of bad character can only exasperate the disease. Had he come to any other conclusion, it must have been by a miracle.

(*e.*) *Agents calculated to alter the character of exposed cancerous surfaces.*—*Gastric juice.*—The alterative and solvent properties of gastric juice are so marked, that little doubt could be entertained *à priori* of its modifying the character of ulcerated surfaces. There can be no question, as a matter of experience, of most beneficial results having been produced by the application of the fluid to obstinate spreading sores of non-cancerous nature; and, even in cases of actual ulcerated cancer, temporary benefit has been obtained. Thus in the Journal de Vandermonde (t. lxxiii. p. 13,) is the history of an unmarried woman, aged thirty-eight, who had a scirrhous tumor as large as a hen's egg in the breast; there was lancinating pain, and a chain of enlarged glands extended to the axilla, one of them having attained such bulk, that removal with the knife was thought unadvisable. The disease advanced, ulceration set in and made rapid progress; various remedies were tried for the relief of the exquisite pain endured by the patient, but in vain. In this state of things gastric juice was had recourse to; the pain diminished, the ulcer became cleaner, and a healthy suppuration appeared. In order to ascertain whether the favourable change really depended on the gastric juice, the remedy was suspended several times, and, in every instance, things returned to their previous ill condition. Under this treatment the ulcer, originally measuring three inches in diameter, was reduced to the size of a sixpence; the patient at this conjuncture, believing herself well, left the hospital (of Geneva); the cancer soon resumed its former destructive tendency, and speedily destroyed her. There seems no reason to impugn the accuracy of this narrative; and it appears to prove clearly, that the agent recommended is capable of effecting distinct improvement in the state of cancerous sores. Senebier, to whom the greater number of experiments with this substance are due, advises the gastric juice of herbivorous animals, especially of the ox, to be used, on account of the facility with which it may be obtained.

Carbonic acid, originally recommended by Peyrilhe as an application to cancerous sores, was also employed by Ewart, and found by Fourcroy to improve the aspect of such ulcers. The amelioration is, however, acknowledged to be temporary. The acid may be applied directly in the gaseous state, in solution, or through the medium of the fermenting poultice.

Lead.—I have already referred to the reputed efficacy of preparations of lead in inducing the resolution of cancerous tumors. Their potency has been estimated even higher than this: Goulard

affirmed he had actually cured *ulcerated* cancer with them. Brambilla extols the virtues of a plaster composed of minium, olive oil, and turnip juice; Gesner* ascribes singular power to the acetate made into a liniment with turpentine. The calmer judgment of Bayle has limited the real value of these preparations to their sedative and anodyne action: as exercising this action in a marked manner, he recommends a combination of six drachms of "litharge of gold," six drachms of vinegar, and two ounces of olive oil, to be spread in a thin layer on the ulcerated surface.

Iodine.—Tincture of iodine as a local application to cancerous sores is undoubtedly capable of beneficially modifying the surface, producing a more healthy aspect, and improving the character of the discharge. But there is no shadow of evidence to prove it possessed of the cicatrising power, which it undoubtedly exercises on ulcers of certain other kinds.

Tar and allied substances.—Petroleum (Ramazzini), *tar ointment*, and more recently *creasote*, have been spoken highly of by different persons. Gräfe† deposes to the value of the latter substance: he states that a spreading cancer of the face and arch of the palate was remarkably improved in condition by its application to the surface. It may be applied either pure or diluted with water; it is said not to produce much pain.‡ I some years since saw creasote tried on a tolerably large scale in the treatment of ulcers of various kinds and fistulous sores; temporary amelioration was the most favourable result of its application (either in the diluted or pure states), and in many instances it exasperated the diseased action. Cancerous ulcers appeared to be affected in very much the same manner as others of an incontrollable character. My experience differs from that of Gräfe in one respect; I have known the application productive of intense pain.

Turpentine was at one time much in vogue in the topical treatment of cancerous sores, and Lassus testifies to his having seen an intractable ulcer of the kind almost cicatrised by a three months' assiduous application of this substance. Turpentine has not, however, held its ground as a curative agent.

Terchloride of carbon.—A fluid described under this name by Mr. Tuson§ is said by him to have proved beneficial in relieving the pain of cancerous sores, and destroying the fœtor of the dis-

* Beobachtungen, B. v. S. 141.

† In seinem und Walther's Journ. Bd. xx. S. 151.

‡ See also Marchal, Gaz. Méd. de Paris, p. 107. 1835.

§ Lancet, July 1843.

charge. Mr. A. Ure* contends that the substance is not a chloride of carbon, but bears a strong resemblance to chloric æther. This is a matter of secondary consequence; the point of practical interest is, that from some trials made by Mr. Ure the fluid would appear to be without active influence of any kind on cancerous sores.

Mineral acids and escharotic substances generally.—Substances belonging to this class may be employed with three different objects: (*a.*) to simply stimulate the surface, and modify the actions of which it is the seat; (*b.*) to destroy layer by layer the substance of a cancerous mass, which has been exposed by ulceration; (*c.*) to enucleate a tumor. The statements now about to be made bear upon the two first modes of action only; and both these are fundamentally similar, the difference being one rather of degree than of nature.

Caustics of various kinds have from the earliest times been employed for the purpose of completing the destruction which the ulcerative process had commenced in cancerous masses.

Actual cautery.—The actual cautery was probably, as Bayle observes, the first agent used for the purpose.† The French surgeons still occasionally employ it, especially for the removal of fungating excrescences, and sometimes, as an additional security, burn the exposed surface after the removal of a cancerous mass. In our own country there is a repugnance (which, under ordinary circumstances, cannot be considered otherwise than just) to the actual cautery, and it has fallen almost completely into disuse.

A curious mode of applying heat to cancerous surfaces was devised by Le Comte of Arceuil. It consisted in cauterising with the *rays of the sun*, collected by a powerful lens:‡ this eccentric process is said to have been attended with success in one case of cancer of the lower lip. But one case scarcely suffices to prove its value; and, though the process possesses the advantage of retaining the whole amount of heat employed, until it has acted as deeply as it is intended it should, Le Comte has not, so far as I have been able to learn, had any imitators.

Caustic potass, the *bichloride of mercury*,§ the *chloride of antimony*, and the *nitrate of silver*, are among the potential caustics which have enjoyed more or less reputation for their effects on can-

* Pharmaceutical Journal, vol. iii. No. 4.

† Hippocr. Epid. lib. vii.

‡ Mémoires de la Soc. Roy. de Médecine. 1776.

§ See a paper, by M. Ordinaire, on the Treatment of Ulcers of various kinds with corrosive sublimate, in Gaz. Médicale de Paris, Nov. 1839.

cerous ulcers. The *acid nitrate of mercury* (made by dissolving one part of proto-nitrate of mercury in eight of nitric acid) is a favourite escharotic in the French hospitals; and is especially lauded by Recamier as possessing a marked affinity for the diseased structure, and as producing healthy granulations even on a cancerous basis. It is superficial in its action.

But, of all substances which have been applied with the present views in the treatment of cancer, *arsenious acid* is the most important. Fuchsius, who first used it, combined it with soot and serpentery; Guy, in his secret remedy, with sulphur, ranunculus sylvestris, and soot. Rousselot's celebrated powder consists of two drachms of arsenious acid, carefully mixed with two ounces each of the bisulphuret of mercury, and of the resin of Pterocarpus Draco; those of Frère Come and Dubois of the same ingredients in different proportions. When about to be used, these powders are mixed with a sufficient quantity of saliva to form a paste, which is laid on the surface (previously carefully cleansed) in a layer two lines thick. Dupuytren was in the habit of using a powder composed of ninety-nine parts of calomel to one of arsenious acid, increasing the latter to five or six parts in the hundred; or a liquid of somewhat greater strength, composed of the same ingredients suspended in distilled water.

Generally speaking, in twenty-four hours after the application of the paste, this adheres closely to the subjacent surface, and a slough separates within a period varying from twelve days to six weeks. The new surface exhibits a sound aspect, and is capable of granulating in a healthy manner. At least such is the result in favourable cases, and numbers of these are on record. But in some instances a second and a third application are required; and the dangers increase to such a degree, that it is now matter of received doctrine that these preparations should only be used in cases of superficial cancer, — in ulcerations similar somewhat in character to those of lupus and noli me tangere. The powder of Rousselot possesses the advantage of being less readily absorbed; a point of vast importance, as fatal effects (cases of Fernel and Roux, for example,) have more than once ensued from the entry of the poison into the circulation.

M. Grandpré has introduced, and successfully employed, the practice of fumigation of superficial cancerous ulcers with cinnabar and arsenious acid: a particular apparatus is, of course, necessary to prevent inhalation of the vapours.

That arsenical preparations have with some frequency effected a

cure of cancerous ulcers in the manner described, is a fact concerning which no doubt can be held. But the hazardous nature of the treatment makes it desirable that a caustic, possessed of similar destructive powers, and free from its poisonous properties, should, if possible, be found. Within the last few years the *chloride of zinc* has been introduced with these claims by M. Hänck and M. Cancoin. I have seen some superficial ulcers of an intractable character cured with this substance in the Paris hospitals; and the experience obtained in this country is favourable to its employment. According to M. A. Ure,* it produces a rapid and salutary change on the characters of corroding ulcers. In two cases of cancerous ulceration of the face, where the disease, though of long standing, was superficial, it acted most favourably in the hands of Mr. Lawrence, and the cures have been permanent.† Mr. M'Clintock‡ reports three successful cases of similar kind. The preparation employed by Mr. Ure is a combination of one part of the chloride to two of sulphate of lime: M. Cancoin mixes the salt with various proportions of flour. The thickness of the layer of paste must be proportional to the depth of eschar required to be produced. Its immediate effect is that of a powerful stimulant, causing great vascular excitement, with swelling, bright redness, and severe pain, the last continuing twenty-four or forty-eight hours, or even longer.

The *chloride of gold* appears to have produced very remarkable effects in the hands of M. Recamier. A woman affected with fungating cancer of the cervix uteri, which had already destroyed almost the entire of that portion of the organ, underwent seven or eight applications of this caustic: the local and general symptoms yielded completely; ulceration ceased; the body of the organ, which had been swollen, lost its unnatural size; the lancinating pain and hæmorrhages were no longer complained of. This caustic is prepared by mixing nitrochloric acid (aqua regia) with pure chloride of gold, in the proportion of one ounce of the acid to six grains of the salt.§ Notwithstanding all this, M. Recamier has, it would seem, given up this preparation for the *chloride of platina*.‖

As a general principle, escharotic agents should be applied in such manner as to produce the requisite effect, if possible, by a single application; otherwise the irritation produced, gives, not necessarily

* Medical Gazette, vol. xviii. p. 287. 1838.

† Crosse, in Trans. of Prov. Assoc. vol. v. p. 61.

‡ Dub. Med. Journ. vol. xxi. p. 326. 1842.

§ Rev. Méd. 1835, tom. ii. p. 380.

‖ Pauly, Mal. de l'Utérus, p. 345.

but commonly, new activity to the disease. In superficial cancerous ulcers of the skin, in cases where carcinomatous matter appears in the cicatrix after operation, or where some suspicious structure has been accidentally left behind, they (especially the chloride of zinc, which is decidedly, all things considered, the most advisable remedy of the class,) may be safely and advantageously employed.

SECTION III.

PALLIATIVE TREATMENT.

The objects sought by palliative treatment are: (1.) Modification of the course of the disease locally and generally; (2.) Relief of symptoms. And these objects are accomplished by local and general means. It is inferrible from what has been said concerning many alleged curative agents, that their strongest claim really amounts to no more than the possession of some palliative power: to these I shall make no further reference in the present place.

(1.) *Local.—Cold applications* and *evaporating lotions* are indicated when the affected part is hot, full, and tense. They remove these uncomfortable conditions, but are not otherwise serviceable; and the pretension that tumors may be arrested in progress by such topical means I believe to be utterly hollow.

Almost all the dressings for cancerous sores have been devised with the view of relieving pain, or removing fœtor. Some practitioners give the preference to *hemlock poultices*, made of the recent plant, as a sedative application; *bruised carrots* also ease pain, and correct fœtor. The latter vegetable was first brought into notice by Sultzer in 1766, and *more solito* announced as possessing the power of radically curing the disease. *Boiled figs* (boiled in milk, Burns) and *vegetable charcoal* have been used with similar views; some practitioners simply cover the part with compresses steeped in *laudanum*, or better, the *aqueous solution of opium;* fomentations of *stramonium leaves* are mentioned by Dr. Warren. *Dry lint*, simple *water dressing*, pledgets soaked in solution of *nitrate of silver*, or in some preparation of *iron*, may also be used. *Decoction of cinchona with tincture of myrrh* is found a serviceable application where the surface is flabby and disposed to bleed. The *chlorurets of lime* or *soda* are useful in removing fœtor, and are said to produce a good effect occasionally on the surface of the ulcer. I have seen the condition of a cancerous ulcer improved greatly, but temporarily only, by the *biniodide of mercury* ointment.

Particular indications will arise, rendering one or other of these substances more advisable than the rest; or mere change, for change' sake, will be advantageous from time to time. It is scarcely necessary to advert to the notorious fact, that the efficacy of local palliatives, no matter how great at first, soon diminishes in the majority of cases. The temperature of dressings should, as a general rule, be regulated by the patient's feelings; but I am persuaded of the correctness of the very prevalent opinion that warm applications (however agreeable they may be to the patient) are detrimental.

Hæmorrhage is occasionally productive of temporary alleviation of pain, and when moderate in quantity, and of rare occurrence, may therefore prove rather favourable than otherwise. Under other circumstances it is of course necessary to stop it, which is often a task of much difficulty. Should the internal use of *acetate of lead*, *gallic acid*, or *ergot of rye*, combined with the application of *cold* or of the *oil of turpentine* externally, have failed in producing the desired effect, more active measures must be resorted to. When depending on capillary effusion, *pressure* is the most likely means of arresting the effusion; when from the perforation of an artery, *ligature of the vessel* is indicated. This should be practised outside the morbid growth. Mr. Travers was in one instance obliged to tie the carotid to stop the bleeding from an encephaloid tumor at the angle of the jaw. Well-directed pressure will not only, in many instances, suffice to stop the flow of blood; but, as has already been stated, the permanent prevention of hæmorrhage is one of the advantages of the treatment by compression.

(2.) *General.*—In conducting the general treatment of a cancerous patient, the attainment of as great an amount of invigoration of the system as is compatible with the absence of stimulation, is the object to be constantly held in view. Many of the medicinal substances, classed as curative, will promote this end; drugs exhibited specially for the purpose are rarely successful, because their administration interferes with that of others, which experience has shown to be more directly useful in the disease. And, as a general fact, the correct hygienic management of the patient will prove more serviceable than any species of tonic medication.

The state of the different secretions must be carefully watched, and due alvine action regularly obtained; mild aperients or laxative enemata being, if necessary, employed for the purpose.

The internal use of *opium*, and its preparations, must be had recourse to for the relief of pain and sleeplessness; nothing contri-

butes more effectually to wear out patients than continued loss of rest. The salts of morphia, especially the hydrochlorate, constitute the most convenient form for exhibition. Squire's solution of the bimeconate I have used pretty extensively, and ascertained that it is in some instances borne, when the other salts of morphia disagree. The ill effects of opium on the stomach and bowels have led to the trial of the salts of morphia by the endermic method, and, as it is alleged, with excellent results. I have a high opinion of the efficacy of morphia applied in this way in various affections; but I have not employed the plan in cases of cancer, as I cannot believe its constant repetition to be free from danger, especially in the more advanced stages of the disease. Should peculiar circumstances determine the practitioner in adopting the method, it will be advisable, at least, not to raise the cuticle in the immediate vicinity of the disease, if this be external.

I have no experience of the *cannabis Indica* as a palliative in cancer; but the estimate I have been led to form from a (perhaps too limited) trial of it in various other affections, would not encourage me to hope much from it in the former. *Stramonium* is useful as a change; and friction with ointments or liniments containing *belladonna*, *aconite*, *aconitina*, or *veratria*, will sometimes succeed in mitigating pain, where the internal use of narcotics has failed. The latter powerful alkaloids should only be employed when the cancerous disease is deeply seated; as, for instance, in friction of the epigastrium in cases of cancer of the stomach.

Counter-irritation in the form of *blisters*, *issues*, or *setons*, has had its advocates, and has occasionally appeared to produce beneficial effects. But I cannot help believing that the connexion of the counter-irritation and the improvement must have been merely one of coincidence, and that the opinion of Mr. Burns, who maintains it can never do good, and must often exasperate the disease, is not far from the truth. Positive and serious mischief may indeed result from the practice: M. Cruveilhier * refers to a case in which a blistered surface became cancerous; the fact had already been noticed by Monteggia. (See also p. 169.)

The *diet* of cancerous patients should be regulated by their capabilities of digestion; the habit of cramming food into a stomach incapable of aiding in its assimilation is as positively deleterious as the system of starvation enforced by the practitioners of the Broussaisian school. The advantages of rigid abstinence have, it is true,

* Anatomie Pathologique, Livraison xxvii. Mammelles, p. 4.

been enforced on purely practical grounds: Pouteau flattered himself he had radically cured several patients by limiting their nourishment to five or six pints of iced water daily for a period of about two months; Pearson and Lambe in this country, and Hufeland in Germany, were also advocates for extreme restriction in diet. At the present day a system of starvation is, on the Continent, frequently enforced as an adjunct to the local antiphlogistic treatment; but, though the frame be by these means rapidly reduced to a state of emaciation, the cancers, they were designed to destroy, flourish as luxuriously, as though this additional torture had not been inflicted upon the sufferers. Such treatment promotes the rapid occurrence of debility and sinking, and (as just consideration of the nature of carcinoma would lead us to expect) unfits the organism wholly for combating with the destructive influence of the disease. Suffice it to say, that both reason and unbiassed experience demonstrate the appropriateness of a light, easily digestible, succulent diet, where no *special circumstance exists to contra-indicate it.* Stimulants of all kinds are, as a general proposition, to be avoided; but particular states may arise in which indulgence in the use of small quantities of wine or of malt liquor (especially East India ale) will not only be allowable, but highly serviceable.

The *hygienic condition* of the patient must be carefully attended to. He should be directed to take moderate exercise daily; cheerfulness of mind requires to be promoted, as far as possible, and the cares of business, speculations, and intellectual exertion avoided; participation in public and private amusements, so long as circumstances admit of this, is advisable. In respect of dress, no special indication arises, except in cases of cancer of the breast, under which head I shall recur to the point. Free action from the skin should be promoted by liberal use of cold water and dry friction.

Whether *change of climate* possess any influence in staying the progress of carcinoma, when once established, is a question which, so far as experience goes, must be considered undecided. Unless at the very outset of the disease, and more especially as a prophylactic measure in the manner already described, little is, I fear, to be hoped from its adoption. In a small number of cases referred to by writers, where the patients removed at an advanced stage of the malady from a cold to a warm latitude or *vice versâ*, no apparent amelioration resulted from the change: of these it may be said, "*Cœlum, non* morbum, *mutant, qui trans mare currunt.*" But no fair inference can be drawn from such cases. And it may be as well to observe here, that an *à priori* argument against the utility

of early change of climate, frequently had recourse to, namely, that the disease, it is proposed to relieve, exists among the inhabitants of the very regions selected for the reception of our own invalids, is, in my mind, not altogether sound. In truth, it is not alone the special qualities of any given climate (though these too are highly important), but also the mere fact of its being a new and different one (provided it be not positively deleterious) from that in which in any particular case the disease has been contracted, that renders migration to foreign lands a remedial agent of value in the treatment of chronic maladies: *Pessimum ægro cœlum est, quod ægrum fecit*, is a maxim the general truth of which cannot be disputed. But it is clear that the two conditions of total change of climate, and of removal to a land where the disease is almost unknown, would be best fulfilled by sending sufferers in this country to Egypt or Algeria.

Courses of *mineral waters* (already, p. 191, considered as preventive) have been extolled by some writers as of material service in controlling the advance of the disease. Judiciously chosen they may, I doubt not, prove beneficial to the general health,—if, be it understood, they are taken at their sources. In cases of incipient cancer of the breast or uterus a course of the Kraenchenbrunnen at Ems, followed by another of the Paulinen at Schwalbach, would certainly be advisable, provided no particular contraindication existed, and the treatment of the case could be, in other respects, steadily pursued at the same time.

A certain number of conclusions may be drawn from the facts so far brought before the reader. (1.) Undoubted cancerous tumors have, both before and after ulceration had set in, been cured, or rendered perfectly innocuous, by one or other of a variety of natural processes, occurring spontaneously (p. 134). (2.) An unbiassed survey of recorded experience does not warrant the notion of the invariable incurability of the disease by medicinal means at any stage of its progress. (3.) Testimony, which I am enabled fully to corroborate from my own observation, is not deficient to the fact that growths, cancerous in essence, may at an early stage be totally removed by a persevering use of certain internal and external remedies. (4.) The efficacy of these remedies may be greatly increased by the adoption of well-directed compression, wherever the situation of the tumor permits this. (5.) Even in cases where treatment fails to free patients from the disease, it may not only alleviate their sufferings, but produce an actual suspension of its pro-

gress. (6.) In a certain number of instances, all medicinal agents not only fail in influencing the disease favourably, but, if persisted in, would infallibly exasperate it: this is true of even the most valuable among them, arsenic, iodine, and conium. (7.) It is an unsolved problem, but one of the last importance, to determine what are the conditions, general and individual, which in one case render the disease more or less readily amenable to treatment, and in another (not obviously dissimilar to our perception) invest it with a character of complete intractability. (8.) When obvious dissimilarity exists, cases cease to be logically comparable: but it is well to bear in mind that encephaloid and colloid are less within the influence of medication than scirrhus. (9.) There is no medicine known having claims to the character of a *specific* in cancerous diseases, nor even endowed with the special attribute of invariably modifying the course of the affection. But this is no reason that such a medicine may not be found: the history of mercury and quinine teaches the folly of absolute scepticism in respect of the reality of specific agents. Hence, to use words which I have elsewhere * written in reference to the attempted cure of phthisis: "The efforts of those, who are placed in a position fitted for the purpose, should be unceasing in the search after such a medicine; for nothing can be more unphilosophical than to conclude that it does not exist, because it has not yet been found. It is manifestly not from the *οἱ πολλοι* of drug-lauders that the discovery of so inestimable a boon is legitimately to be expected,—not from those who seize with avidity upon each new medicine introduced into the market, and administer it pell-mell in every form of human ailment, — invariably, according to their own accounts, with the 'happiest effects:'— it is from him who, thoroughly versed in the diagnosis of disease, has enough of incredulity in his intellectual composition to doubt the evidence which is not repeated time after time in similar cases,—who has a fund of patience which no labour can exhaust, and a conviction of the grandeur of his task, which disappointment, be it repeated ever so often, can never succeed in shaking."

SECTION IV.

TREATMENT BY ABLATION.

Cancerous tumors may be removed: (1.) With *cutting instruments;* and in this way (*a.*) the morbid growth alone; or (*b*) the

* Brit. and For. Med. Rev., Oct. 1843, p. 457. I use the word "specific" in its modern and rational sense.

part of the body or the organ in which it has appeared; or (*c.*) the limb to which it is attached, may be cut away: (2.) *By ligature:* (3.) *By potential caustics:* (4.) *By congelation:* (5.) *By the induction of sphacelus.*

§ I. *Removal with the knife.*—Before stating the conclusions, regarding the operation for cancer, to which I have been led by an impartial survey of recorded experience, by inference from established principles, and by consideration of the results of operations of which I have either had information, or to which I have actually been witness, I shall give a concise statement, without comment, of such published opinions as bear directly on the point. It is to be premised, that these opinions, though commonly made by their holders to refer to cancer in general, were in reality derived for the most part from experience of cancer of the breast and testis.

These opinions may be all collected under these heads: (*α.*) Strongly favourable to the operation; (*β.*) Moderately favourable; (*γ.*) Completely opposed to it as an habitual proceeding.

(*α.*) The experience of James Hill of Dumfries* presents itself first on this side of the question. In the year 1770, the general result of the operations performed by this surgeon stood thus: "Of 88 cancers, extirpated at least two years before—not cured, two; broke out afresh, nine; threatened with a relapse, one; in all twelve, which is less than a seventh part of the whole number. At that time there were about forty patients alive and sound, whose cancers had been extirpated above two years before."—Flajani† dwells on the importance of early ablation, having himself removed twenty-seven scirrhi within the first month of their formation, two only of which returned.—Mr. J. Burns‡ finds himself unable "to press too strongly the necessity of early recourse to an operation" in cases of scirrhous cancer. But he states, that, if any of the morbid substance be left behind, "the disease certainly makes more rapid progress than if no operation had been performed." In cases of encephaloid cancer his admission is, that "relapses are still more frequent" than in those of scirrhus.—Gräfe§ affirms that he has "*often* extirpated *fungus hæmatodes* without any relapse having occurred for sixteen, eighteen, or twenty years."—Sir Everard Home‖ thinks the disease may be effectually cured by removal of a

* Cases in Surgery. 1772.

† Collezione di Osserv. e Riflessioni, t. i. p. 277.

‡ Op. cit. vol. i. p. 354.

§ Gazette Médicale de Paris, p. 170, Mars 1835.

‖ Observations on Cancer. 1805.

tumor, *because* the affection is of local origin.—M. Roux* is in favour of the operation as a general proposition; but admits, on the one hand, that cancerous tumors may sometimes be removed by local and general treatment; and, on the other, that the operation is not unfrequently fatal either immediately or in its more remote results. —M. Amussat* holds, that, when all means of treatment have failed, extirpation is the sole method left of saving life in a few instances.

(ϛ.) Mr. Travers is of opinion that permanent recovery "generally" ensues when cancer of the breast is removed before the supervention of pain; but he has never known a patient survive longer than four years after the removal of encephaloid.—Sir Astley Cooper taught that scirrhus returns in a large proportion of cases; but believed (upon what foundation does not appear) that the number of relapses might be diminished by submitting the patient to a course of alterative medicine.—Mr. Warren believes that one case in three is cured by extirpation.—Bayle considered that examples of success were on record in sufficient numbers to show, that the operation should not be absolutely and unqualifiedly rejected from practice. —Richerand† maintains that the number of permanent cures is sufficient to justify extirpation; yet avows, in the same breath almost, that relapse occurs in about four of every five cases.—Sir B. Brodie‡ holds, "that, in the larger proportion of cases in which the operation is performed, the patient is not alive two or three years afterwards; and in a great many cases [always so, when the disease is infiltrated], instead of the operation stopping the disease, it actually seems to hasten its progress." He "finds besides, that the operation in itself is not in all cases free from danger," and concludes that there are "*very few cases* in which the surgeon can offer the operation as *affording a chance* of permanent cure." Even when all the most favourable conditions for success are combined, "in *some* instances" only will the desired issue follow.—Mr. Liston writes: § "Recourse may be had to the knife in some cases; but the circumstances must be very favourable indeed to induce a surgeon to recommend, or warrant him in undertaking, an operation for the removal of malignant disease."—M. Velpeau, candidly admitting the want of success of the operation, rejecting even in some of his writings the commonly accredited notion that extirpation may be undertaken with better chances of cure in some localities than in others, does

* Bulletin de l'Acad. Roy. de Médecine, tom. ix. 1843-44.

† Nosographie Chirurgicale, 3e édit. tom. iv. p. 424.

‡ Medical Gazette, Feb. 9, 1844.

§ Elements of Surgery.

not totally condemn the use of the knife. He even affirms he has excised well-marked specimens of encephaloid from the breast, and seen the patients in perfect health two, four, six, and, in one instance, ten years afterwards. But the slight general importance attached by M. Velpeau to such wondrous cases, is made provokingly obvious by the gloomy depreciations of the use of the knife scattered *passim* through his volumes.

(γ.) Hippocrates taught that even "occult" cancers should not be interfered with; because experience had shown that persons submitted to treatment perish more rapidly than those who have not been thus meddled with.* Celsus† points out that, even after the establishment of cicatrisation, the disease returns and causes death.—Ambroise Paré‡ repudiates the use of the knife and of the actual cautery.—John Browne,§ surgeon to William the Third, forcibly insists on the evils of imperfect excision, and coincides in the statement of Celsus just referred to.—Mercatus|| held that the extirpation of cancer should never be attempted.—Triller,¶ Professor of Surgery at Wittenberg, became convinced, after a lengthened experience, that the operation was more detrimental than beneficial in the majority of instances.—De Houppeville** would scarcely consent to operate, except at the urgent solicitation of the patient.—Monro Primus,†† finding that, of nearly sixty persons who had submitted to the excision of cancer, four only remained free from relapse at the end of two years, and that, in those in whom the disease returned, it made more rapid progress than it commonly did in others, became a staunch opponent of surgical interference. —Delpech‡‡ taught that "every cancer, or rather every local evidence of cancer," [for he believed the removal of the *disease* a mere chimera,] "destroyed by mechanical or chemical means, is sooner or later reproduced, ... no matter what care be taken to ensure complete and early extirpation."—Boyer maintained, that,

* Ὁκόσοισι κρυπτοὶ καρκῖνοι γίγνονται, μὴ θεραπεύειν βέλτιον. θεραπευόμενοι γὰρ ἀπόλλυνται ταχέως. μὴ θεραπευόμενοι δὲ πλείω χρόνον διατελοῦσι.—Aphor. vi. 38.

† De Re Med. lib. v. cap. ii. sect. xiv.

‡ Œuvres, édit. Malgaigne, tom. i. p. 365. 1841.

§ Somatopolitia; or, the City of the Humane Body artificially defended from the Tyranny of Cancers and Gangrenes, p. 87. 1702.

|| De Communibus Mulierum Affect., lib. i. cap. xvii.

¶ De Nocivâ Cancri inveter. extirp. Diss. Wittenb. 1752.

** La Guérison du Cancer, p. 36. 1695.

†† Edinburgh Medical Essays, vol. v.

‡‡ Dict. des Sciences Méd. tom. iii. p. 681. 1812.

of one hundred patients operated upon, ninety-five or ninety-six succumb under a recurrence of the disease.—Scarpa, in the course of a long practice, observed only three cases of extirpation of true scirrhus permanently successful; and lays it down as a law, that removal of encephaloid with the knife invariably hastens death.—Among ninety-eight amputations of scirrhous breasts performed by Benedict, two terminated fatally before the wound had closed; in eighty-three cases the disease returned after cicatrisation, and proved fatal "more rapidly than if no operation had been done;" in thirteen no relapse was heard of, but Benedict was morally persuaded that some of these cases were not truly scirrhous.*—Mr. Mayo's† experience has led him to the conclusion that, "after amputation of a scirrhous breast, *under the most favourable circumstances*,—that is to say, when the operation is performed at the earliest period at which the structural character of the disease has declared itself in the gland, no other part being yet invaded by it, and the diseased structure being entirely removed,—I believe that in *ninety-nine cases out of a hundred the disease returns* either in the cicatrix or in the axillary or subclavian glands. The operation, therefore, cannot be performed with any reasonable prospect of saving the patient eventually from the disease."—Dr. Macfarlane‡ has "never seen a case, *even of the most favourable description, in which the disease did not return*, although every precaution was adopted to render the operation successful." And the experience on which this statement rests is far from being very limited: Dr. Macfarlane refers to a hundred and eighteen cases, (thirty-two operated upon by himself, eighty-six by friends,) and though in the majority the "parts were freely and extensively removed . . . at an early period, and under the most favourable circumstances . . . in many instances no distinct indication of constitutional deterioration being present, yet *in all* the disease returned both externally and internally, and proved fatal."—Professor Pockels, to judge from the language of Müller, appears to regard his having once cured cancer of the breast by excision, as a very extraordinary instance of good fortune.

From these conflicting opinions what general inference can be drawn? That human judgment is infinitely fallible, would appear the sole conclusion they supply. But, doubtless, much of this

* Rust's Magazin, B. xliv. S. 191. 1835.
† Outlines of Pathology, p. 573.
‡ Medical Gazette, June 2, 1838.

lamentable discordance is to be traced to the fact that the testimonies, presumed by their authors to apply to one and the same, in reality referred to different affections. The exclamation of Richter, when reviewing the clashing results of Monro and J. Hill, "*Jure sane dixeris de uno eodemque morbo hos viros loqui, dubitari fere potest,*" is more than justified by the survey of a wider field. Beyond question, the opinions I have quoted were not all founded upon an experience of the same disease: it is as certain as any non-mathematical proposition in existence can be, that many of Hill's cases must have been examples of simple chronic induration, of encysted or fibrous tumor, chronic abscess, or other non-carcinomatous conditions; no sane person can believe that Flajani cut away twenty-seven genuine scirrhous cancers with the results he describes; nor can we, without acceding to the doctrine that nature's laws may be reversed by the dexterity and intellectual resources of particular individuals, give credence to the statement of Gräfe's alleged success in the excision of fungus hæmatodes. No, in the quaintly expressive language of Dionis—"Pour chanter victoire, il ne faut pas avoir pris une glande engorgée pour un cancer caractérisé, comme font quelquefois ceux qui se vantent d'en avoir guéri des milliers."* It is to be observed, too, that the opinions of writers opposed to the performance of the operation appear to carry more weight with them than those of persons maintaining the propriety of extirpation. Most advocates of excision, in truth, speak under the influence of a vague notion of the incurability of the disease by other means,—of the wisdom of doing something decisive,—of affording patients their only chance, &c.; but adduce no positive evidence in defence of their position. The testimony of others is worse than valueless, because based completely upon theory, and upon erroneous theory,—weigh, for example, the worth of Sir E. Home's dogma, founded upon the fancy of the local origin of the disease! It is true, that an exception may be claimed in favour of the statements emanating from Mr. Hill; but he gives no description of the tumors removed; and in five only of the eighty-eight cases was the mamma extirpated; in two of these the wound did not heal; in another the disease returned; and the remaining two continued well at the date of publication. Is there anything very encouraging

* Cours d'Opérations, p. 640. A surgeon who had, as he alleged, cut away ten scirrhous mammæ without a single relapse, requested Sir B. Brodie to examine another cancer he was about to remove: "it was nothing more than a chronic abscess of the breast, which he denominated scirrhus."—(Medical Gazette, Feb. 16, 1844, p. 664.) Here is a simple clue to the comprehension of many marvels.

in this? On the other hand, the testimony against extirpation is founded on actual and extensive experience of its inefficacy, and supported by numerical documents.

The extirpation of cancer may be undertaken with the following various intentions: To cure the disease; To prolong life; To relieve urgent symptoms; To procure a comparatively easy death for the sufferer; To satisfy the importunate desires of patients. The proceeding requires separate examination as a means of effecting each of these ends.

(A.) *Of the operation as a curative measure.*—I shall here throw into propositions a certain number of inferences from unquestionable facts; and endeavour to deduce from these propositions a few principles bearing upon the admissibility of the operation generally, and upon its application in particular cases.

(1.) *The removal of a cancerous tumor* may *cure the disease.*—This proposition is justified by the fact that morbid productions possessing the anatomical and pathological characters of scirrhus have been removed with the knife, and no return of the disease been observed for a number of years, and occasionally during the entire course of an existence prolonged beyond the calculated expectation of life in healthy individuals at the period of removal. Such being the result of experience, it becomes a matter of extremely slight consequence whether theory would, or would not, lead to the conclusion that removal of cancerous tumors cannot cure the disease, because the local formation is but a symptom of a general vice of the system. The apparent contradiction may, however, be rendered less unintelligible by supposing that the local removal acts as a sort of alterative on the constitution, or that a change co-arises spontaneously in the general state of the system. This may be rendered clearer by an illustration. Phthisis, a disease of which the constitutional nature is not disputed, is well ascertained to have disappeared symptomatically after the expulsion of tuberculous matter, and the establishment of certain changes in the properties and structure of the walls of cavities, or after the conversion of that matter into inorganic salts. Again, all observers are acquainted with the regeneration, as it were, of the individual, which sometimes follows the removal of a joint affected with the same tuberculous or scrofulous disease. Besides, it seems to me that a clue to the difficulty may be obtained from the theory I have ventured (p. 189) to propose of the nature of cancerous disease.

(2.) *No combination of circumstances ensures the patient, who sub-*

mits to the excision of a cancerous growth, from return of the disease. —This proposition rests upon the fact that scirrhi have been frequently extirpated during the very earliest phasis of their career (at a period so early that their nature could not be considered positively certain, unless upon the anatomical evidence obtainable through the operation); scirrhi which had not become the seat of pain, nor contaminated the neighbouring tissues, or the communicating lymphatic system, nor apparently affected the constitution,—and yet these scirrhi have returned, and rapidly destroyed life.

(3.) *Scarcely any combination of circumstances renders recovery from the operation, and prolongation of life, a matter of absolute impossibility.*—Ulcerated cancers, the seat of excruciating pain, abundant discharge, and occasional profuse hæmorrhage, have been extirpated, together with knots of contaminated lymphatic glands, from persons exhibiting cachectic symptoms apparently in a marked degree; and the life of these persons has been obviously prolonged, sometimes for years, in a state of comparative, or even perfect comfort. But cases of this kind are of such infinitely rare occurrence, that they may fairly be considered almost marvellous.

(4.) *The existence of cancerous contamination of the lymphatic glands renders failure of the operation as nearly as possible a matter of absolute certainty.*—The excessively rare cases of success recorded under these circumstances, can only be regarded as fortunate chances; and it cannot be questioned that, in some instances of successful issue, the glands were simply indurated, and not cancerous.

(5.) *Where any portion of the morbid growth is accidentally left behind, the disease runs a materially more rapid course, than if it had not been interfered with surgically.*—To the truth of this proposition even the most energetic advocates of the operation (*inter alios*, Mr. J. Burns) bear witness.

(6.) *Should the cancerous diathesis exist, (no matter whether its manifestations have become actually apparent or not,) removal of a tumor inevitably determines its outbreak.*—Cases abound in illustration of the fatal effects of operations undertaken under these circumstances. Excision of a tumor seems to awaken a dormant force; cancers spring up in all directions, and enlarge with a power of vegetation almost incredible.

(7.) *When cancers in a state of active growth are cut out, the invariable result is reproduction, and increased energy of progress of the morbid mass.*

(8.) *Cancers, the exciting cause of which has been some local injury, are probably less prone to return after operation, than those which have*

sprung up spontaneously.—Monro I^us^ admitted that extirpation might in such cases be performed with some legitimate hope that the disease would not return. But herein lies an easy source of error: tumors, originating thus, much less commonly exhibit structure of cancerous, than of other, types; although the functional and even physical condition of the parts involved may, before extirpation, support the idea of the carcinomatous nature of the enlargement.

(9.) *The success of excision in individuals belonging to a family of cancerous taint is even below the average.*

(10.) *Reproduction of the disease becomes almost inevitable in cases where the skin or textures intervening between the tumor and integuments participate in the cancerous affection, or where these structures are, though not cancerously, still morbidly affected in consequence of the juxta-position of the new growth.* — On the accuracy of the first clause of this proposition it is unnecessary to insist. The least amount of such alteration will bring the case within the present category. The dimpling of the skin sometimes occurring over a scirrhus of the breast, is for this reason almost a certain evidence that an operation will fail. The most ready exemplification of the second clause, which occurs to me, is that afforded by retraction of the nipple in cases of cancer of the mamma.

(11.) *Even simple adhesion of the new formation to the part in which it grows, or to the subjacent textures renders failure almost a matter of absolute certainty.*

(12.) *The existence of the cachexia renders perfect and permanent recovery infinitely improbable, if* (Prop. 3.) *not impossible.* — Morgagni* relates the case of a woman in a state of obvious cachexia, from whom Valsalva excised a massy schirro-encephaloid mamma (after having diminished its size by ligature), with extraordinary influence on the general health, and a temporary regeneration almost of the individual. But two years after the operation the woman came to the hospital with a new growth; and of her ultimate fate no record is preserved. It is to be borne in mind that the altered tint of skin, and other conditions significant of the true cachexia, may be simulated very closely by the effects of hæmorrhage and anæmia; and it is consequently probable that in certain cases of recovery ensuing, as it was presumed, after the establishment of the real cachexia, this pseudo-cachexia deceived the observer.

(13.) *With each repetition of the operation in the seat of original formation, the chances of return of the disease increase to an incalcula-*

* De Sed. et Caus. Morb., lib. iv. epist. l. art. 16.

ble degree.—No question can be made of the accuracy of this position; still true cancer has, it is alleged, been radically cured after a second, nay, even a third or fourth operation. Lacombe* relates with full detail the history of a woman operated on four times for cancer of the breast; at the time his work was published, this fortunate individual had enjoyed perfect health for upwards of five years. Sabatier† refers to two cases of similar character. In estimating the value of such accounts as these, it must not be forgotten that there was a period, not far removed from the present hour, when reproduction after extirpation was considered demonstrative of the cancerous nature of the disease so reproduced. Even modern experience (Roux), however, is said to furnish evidence, *raris intervallis*, that a second and even a third operation has permanently and completely delivered patients from true carcinoma; but the distinct and detailed narratives of such cases are nowhere to be discovered.

(14.) *The removal of two cancers simultaneously, or immediately after each other, may be considered a procedure which will almost of necessity be followed by return of the disease.*—I doubt whether such operations have ever really been performed in cases of cancer. The commonly quoted case of Foubert,‡ who cut out in the same day both breasts of a patient (the one ulcerated, the other scirrhous), is not perfectly satisfactory in its details. And that the girl (aged twenty-two), whose two breasts, weighing twenty-nine pounds, were extirpated by MM. Thuillier and Thibault,§ at an interval of three months, was not really affected with cancer of those organs is unquestionable.

(15.) *The probabilities of effecting a cure are said to vary with the species of cancer.*—There are more instances on record of alleged permanent recovery after the ablation of encephaloid than of scirrhus. But I believe that this depends upon the frequent connexion of extirpated encephaloid growths with bone (see Prop. 16); and that, if tumors of this origin be excepted, the average result is still more disastrous when the affection is of the encephaloid than the scirrhous species. The tendency of colloid to reproduction requires further investigation, but is probably about the same as that of scirrhus.

(16.) *The removal of cancerous growths is more prone to be followed by relapse when the disease occupies certain organs or tissues than others.*—A cancerous tumor of the *breast* is more likely to be repro-

* Propositions sur le Cancer. 1805.

† Médecine Opératoire, tom. ii. p. 335.

‡ Mém. de l'Acad. Roy. de Chirurgie, tom. iii.

§ Gaudeix Laberderie, Diss. sur le Cancer: Thèses de Paris. 1827.

duced after excision than a similar mass connected with *bone*. This is a matter of general belief, and is probably true: but numerical proof of the proposition is wanting; and the fact that under the term "osteosarcoma" have been included growths in bone of almost every description, fibrous, enchondromatous, &c., as well as the truly cancerous, renders it exceedingly probable, if not certain, that the supposed immunity of bone in this respect has been exaggerated. Again, I think it must be granted, (although it be certain that simple indurations, and syphilitic sores and vegetations, have sometimes been removed as cancers in this situation,) that cancer of the *lip* is somewhat less prone to re-appear after excision than cancers in numerous other parts. It has been vaguely affirmed that cancer of the *eye* exhibits less than the average proneness to return; I believe the opinion to be totally unfounded, nor is testimony wanting to support the more gloomy view. Mr. Lawrence* admits that, as a question of experience, the removal of encephaloid, "even in an early stage, is unavailing." Mr. Travers† "is not acquainted with any case in which the patient, who has survived two years, has not been revisited by the disease." Mr. Syme‡ expresses his "conviction that it would be better, both for the interests of humanity and the credit of surgery, if the operation were entirely abandoned." The alleged successes of M. Lisfranc in the amputation of the cancerous *cervix uteri* imposed for a while on public credulity; but M. Pauly,§ in exposing the naked truth, that not a single case of the kind proved ultimately successful, furnished a much more credible result. The *testicle* and *penis* are organs upon which operations have proved peculiarly unfortunate; and surgical interference with *meningeal* cancers has been most fatal in its effects.

(17.) *In cases where cancerous substance is simply superadded to pre-existing encysted structure, the chances that relapse will not occur, are above the average, provided the entire of both morbid products be removed.*—But such mode of development of carcinoma is excessively rare, comparatively speaking,—a consideration which reduces materially the practical advantage of the fact.

(18.) *Cancers which have spontaneously, or through the influence of treatment, ceased to enlarge, to cause local suffering, or general disturbance—in fact, become quiescent—have sometimes been cut out, and the operation been followed by rapid reproduction of the disease, with*

* Diseases of the Eye, p. 701. Edn. 1841.

† Med. Chir. Trans. vol. xv. p. 239. 1829.

‡ Edinb. Med. and Surg. Journ. vol. xliv. p. 6. 1835.

§ Maladies de l'Utérus, p. 465. 1836.

aggravation of the local and general symptoms and early death.—Abundant testimony to the truth of this position exists; none is more precise or true to fact than that of Dr. Macfarlane. This sober and conscientious surgeon "could adduce the cases of several patients who had laboured under cancer of the breast for *ten, fifteen and twenty years*, and who" [yielding to vague apprehensions of the terrible nature of the disease, they submitted to excision] "*were cut off in three or four months by an operation.*"

(19.) *Organs, as for instance the breast, have sometimes been removed for affections presumedly cancerous, but in reality of the most innocuous character (e.g. cysts and even abscesses): in such instances the operation has occasionally proved fatal.*—This fact would appear to furnish an argument, not against the operation for cancer, but against its misapplication. Yet, in point of fact, it supplies a practical motive for being chary of the use of the knife,—for the simple reason that the most experienced persons have occasionally committed the errors implied. It is enough, in support of this statement, to refer to the commendable though most painful disclosures of M. Roux on the subject.*

Now these propositions appear to me, as a matter of necessity, to justify the following inferences concerning the operation. First: in as much as the number of permanent recoveries is infinitely small, and as no combination of circumstances, however favourable, protects the patient from relapse,—*the operation cannot in any individual case be recommended as likely to cure the disease.* Secondly: in as much as no operation by excision is performed without the chance of some of the diseased structure being left behind, an accident which hastens the progress of the malady;—in as much as absolute certainty of the freedom of internal organs from the disease is unattainable;—in as much as the dormant cancerous diathesis is sometimes roused into activity by removal of a tumor;—in as much as cancers in a state of active growth acquire increased energy of vegetation, if reproduced after extirpation;—and, lastly, in as much as the operation itself has not very unfrequently proved both the occasion and the cause of death;† *excision cannot be undertaken without imminent risk of placing the patient in a worse condition than he or she was previously to the use of the knife.* Thirdly: as a corollary from the first and second inferences; and in as much as the disease has un-

* Bulletin de l'Acad. Roy de Médecine, tom. ix. p. 572. 1843-44.

† The proportion of cases in which the operation *per se* destroys life, I have not been able to ascertain on a large scale. Sir B. Brodie says, "I have myself lost patients after the operation, and every surgeon has had the same misfortune."—

questionably been cured, or arrested in its progress, by milder measures;—and in as much as the disease does not by any means inevitably and unfailingly run a course destructive of life;—and in as much as quiescent cancers have sometimes been succeeded by most active and virulent growths in consequence of untimely extirpation;—and in as much as life has sometimes fallen a sacrifice to operations for the removal of putative cancers; *the operation should, as a general truth, be abstained from.*

These inferences refer to the general propriety of extirpation. It is not impossible to make them more precise in their applicability to individual cases. The chances of success under certain circumstances rise, in fact, sufficiently above the mean, to warrant impartial persons in holding out some faint hopes of permanent recovery; in others, on the contrary, they fall so much below it as to render such restoration all but an impossibility. I shall briefly enumerate the circumstances which entitle patients to be specially ranked in the former or the latter of these categories; it is to be remembered that the operation is spoken of still as a professedly curative measure.

Patients, having a cancerous tumor distinctly traceable to a blow as its apparently exciting cause, whose constitution is as yet unimpaired, and in whom no hereditary taint can be discovered; in whom the lymphatic system is unaffected; in whom the new growth is of the scirrhous species, tuberiform and not infiltrated, free from adhesion, of moderate size, unaccompanied with morbid changes in the skin, and springing from bone (except the skull), or connected with the lip, belong to the first category.

Patients belonging to the second category—patients in whom the operation is absolutely contra-indicated as a curative measure—are those: who have cancers either so placed that any part of them must of necessity be left behind, or manifestly in a state of active growth; in whom the presence of internal cancer is even matter of faint likelihood; in whom the cancerous cachexia is clearly established; in whom the communicating lymphatic system has even apparently grown cancerous; in whom the morbid mass is of the encephaloid species (unless it be connected with bone) and of large dimensions; in whom the tumor is so placed and constituted, that the manual part of the operation (or its immediate consequences) is in itself

(Loc. cit. p. 632.) Of 130 operations (Benedict and Macfarlane) four were immediately fatal. "Of twenty-five patients operated on, two died from the effects of the operation," according to the tables published from the Royal Infirmary of Edinburgh by Professor Reid (p. 25. 1842).

attended with serious risk to life; or when the age and debility of the individual are such as to entail similar danger. A condition which lessens the chances of success to such an extent as to become, in my mind, absolutely prohibitory of the operation, is the existence of enlargement and induration (there is no mode of determining before excision that these changes are not cancerous) of the lymphatic glands. In some situations, *e. g.* the axilla, they are often found to be much more numerous than had been supposed before division of the skin, and their removal becomes a matter of impossibility. Notwithstanding all this, there are a certain number of operators (as, for instance, MM. Amussat and Lisfranc), who consider such morbid appearances, especially if recent, scarcely any barrier to the use of the knife. But I heartily concur in the strongly-worded opinion of Mr. Liston: "When enlarged glands are perceptible above the clavicle, or in the intercostal spaces" [in cancer of the mamma], "the practitioner who would advise interference with the original tumor, must be grossly ignorant, atrociously unprincipled, or of unsound mind." Persons in whom, on the other hand, the disease has existed for a number of years in an almost stationary condition, giving rise to no serious derangement of health, and forming rather a local inconvenience than a malady, should certainly not be interfered with.

Dr. Macfarlane (loc. cit.) found that the re-appearance of the disease, and its subsequent progress, were more rapid in robust women of sanguine temperament, than in nervous or lymphatic persons; in the former, too, the internal organs were sooner affected. Sir B. Brodie points out hysterical women as especially unfit for operation.

The period or stage of the disease at which the operation may be undertaken with the strongest chances of curative result, cannot be considered to have been determined by past experience. Opinions the most diametrically opposed are held upon the point, and urged on either side with energy and plausibility. The weight of general conviction is in favour of early extirpation, and with those who conceive that, the longer the primary local malady exists, the greater the likelihood of lymphatic contamination and other evils, lessening seriously the patients' chances of recovery. Nevertheless, it is to be observed, that persons who have acquired and propagated this conviction, invariably start from the notion of the absolute necessity of operation in all cases: the significance of their conviction is thereby deeply impaired. Besides, an obvious source of fallacy lies in the fact that, when indurations, putatively scirrhous, are excised

at a very early period after their appearance, neither their symptomatic nor their anatomical characters are defined with sufficient clearness to render error as to both unlikely: the significance and value of such alleged experience as that of Flajani (p. 226) are upon these grounds altogether debateable.

Again, "it has been stated on high authority," says Mr. J. Burns, (Op. cit. t. i. p. 357,) "that a woman has a better chance of a complete cure if the operation have been performed late than early, provided the disease continue limited, as there is a greater probability, in that case, that it remains local." This seeming paradox (of which Galen* may be regarded as the originator, for he taught that only fully formed cancers, and not those still occult, should be interfered with, with the cautery or knife,) has found defenders, indeed, in not a few practitioners; and recently MM. Hervez de Chegoin and Tanchou have warmly espoused it. According to the latter, cancer appears to localise itself with the progress of time under the influence of treatment, and loses proportionally its influence on the system; and so (as a matter of fact) cancer of the breast is known occasionally to undergo spontaneous suspension of progress, whereas M. Tanchou doubts the existence of a single case of real cancer having been cured by *early* operation. Some statistical results, published among the facts collected by M. Leroy d'Etiolles (loc. cit.), give unexpected support to the notion of the inutility of early, as contradistinguished to late, operation. Of 801 extirpations of cancers, 117 were performed less than a year after the appearance of the tumor; of these 117 operations 61 (or 52·1 per 100) were followed by reproduction within the course of the first year succeeding the use of the knife. And it is to be remarked, that, at the time the author wrote, a full year had not elapsed since 112 of the 117 operations had been performed. On the other hand, among the operations not followed by reproduction there were 52 in which the morbid growth had, when removed, existed for five years. Finally, after careful examination of all the points and available documents bearing upon the question under discussion, I feel myself warranted in establishing the following proposition:—*Of a given number of cancerous individuals a considerably larger proportion will be saved from untimely death under the influence of well devised and judiciously sustained treatment, aided, if this become necessary, by extirpation performed at a comparatively late period, than will recover under the influence of the operation (unpreceded by methodised treatment) effected at the very earliest possible stage of local development.*

* Comment. in Aph. 38, lib. vi.

Acting on the principle of the absolute wisdom of early extirpation in all cases of cancer, operators have removed growths of perfectly innocent character, — growths which would neither have shortened the life, nor materially affected the comfort, of the individual. This is admitted on all hands; but the rejoinder is, that it seems infinitely better to run the risk of removing, in rare instances, morbid structure of innocuous qualities, than to incur the possible evil of leaving a true carcinoma in the body. I was at one time disposed myself to take this view of the matter; but from more extended experience I am now inclined to regard the argument as more specious than solid. Such operations have in truth, as already stated, occasionally proved fatal; nor, especially in the case of females, should the imaginary and real sufferings of the knife be inflicted upon dubious motives. Besides, it is clear the whole value of the argument depends upon the implied notion that excision of cancer is curative; now it has been seen that the precise converse is, as a general proposition, much nearer the truth.

Should a concourse of circumstances arise appearing to warrant the employment of the knife, the most important point to be borne in mind in the performance of the operation is the absolute necessity of excising every particle of diseased matter; and, in order to ensure this result, a stratum of healthy tissue must invariably be removed along with the morbid growth: for this purpose it may be necessary to extirpate an organ, or amputate a limb. It is decidedly advantageous that the wound be united by first intention, but the surgeon should not run the risk of retaining implicated skin to effect this object. When extensive excision of skin is required, the resulting hiatus may be closed up by a plastic operation. Some surgeons, Sir B. Brodie among the number, insist on the importance of preventing loss of blood as much as possible: hæmorrhage, he conceives, lays the foundation of erysipelas, venous inflammation, and other evils.

Attempts have been made to modify the constitution, and influence the tumor locally, with the view of lessening the chances of reproduction. Certain measures have been directed to this species of prophylaxis before and after the operation.

As means employed *prior to operation,* the repeated application of leeches in the neighbourhood of the tumor, with the view of removing any existing inflammatory action, and of diminishing the bulk of the morbid mass, has its advocates. The practice, admitting that it induces the desired effect, seems extremely likely to lead to a false estimate of the limits to which the elementary mole-

cules of the cancer may extend, and hence of causing some of the morbid substance to be left behind. *Compression* may much more rationally be employed with the design in question; though, even after it has been used, ample verge should be given to the knife, and the fact constantly borne in mind that it is better much sound integument should be cut away, than a chance encountered of leaving cancerous cells to vegetate at the edges of the wound. The idea of the utility of a constitutional treatment with the present view seems to have been entertained at a very early period, as the following passage shows: "Galenus autem sectionis tantum chirurgiam admittens, in hunc modum tradit. Si quando cancrum manuum et scalpelli operâ curare *ausus fueris, vacuationem ab atræ bilis purgatione auspiceris.** In modern times not a few persons have recommended an alterative mercurial course; but arsenic and iodine are much more likely to produce an advantageous effect.

As measures to be taken *after the operation*, appears first the exhibition of alterative medicines; and although it would be difficult to demonstrate the amount of benefit obtainable from the plan, still it seems rational and unobjectionable. Delpech relates a case in which a course of preparations of iron and gold appeared to him to have distinctly prevented reproduction. I have no confidence in repeated small blood-lettings, which have nevertheless had their advocates. Again, the establishment of an issue, perpetual blister, or seton, is considered efficacious in this way by some observers. M. Rayer, for instance, "has fancied" that relapses are less frequent after removal of cutaneous cancer, when an issue has been made in either extremity. I can conceive, too, that in persons who have become the subjects of cancer subsequently to the disappearance of chronic cutaneous affections, the peculiar circumstances of their case might possibly render derivation to the skin serviceable; but I cannot refer to actual cases demonstrating the justness of the notion. The popular belief in the protective quality of issues must, at one time at least, have been very strong in France; for the sage Boyer, while admitting their inefficacy, states that the surgeon could not neglect to apply them without compromising his reputation. I have not yet had an opportunity of observing the effects of compression, employed after extirpation, as a means of averting relapse; but I should not hesitate to recommend the practice when no contra-indication existed. Change of climate (among other conditions of as total an alteration in the mode of existence of the individual as it is possible to effect) ought to be

* P. Ægineta, vi. 45, p. 463. Ed. Basil.

adopted; it is, at least, more likely to prove advantageous at the conjuncture now referred to, than during the active progress of the disease.

A few years since M. Martinet (de la Creuse) published some cases in which the return of the disease after ablation was alleged to have been prevented by the aid of plastic surgery. Having attempted to restore by rhinoplasty the portion of a nose which had undergone cancerous ulceration, and given origin to fungous excrescences in spite of excision, the actual cautery and arsenical paste, he was astonished at the rapidity and permanence of cicatrization. In three other cases he performed an analogous operation, and with similar success. Although here we have not a sufficiently extended experience to prove the general value of the plan, yet the results obtained certainly merit attention. Three of the patients were seen three and six years after the operation in perfect health; the fourth died, two years and a half after its performance, of an affection unconnected with her cancer: yet that these were instances in which the disease was likely to prove fatal in the ordinary course of things appears from its previous progress in each, — more especially from the fact that in three of them there had already been relapse after operation, in two recurring even twice. M. Martinet's process consists in "applying a sound, well-nourished flap of skin, taken from a more or less distant part, on the wound resulting from the excision of a cancer, either immediately after the operation or after the development of granulations:" in his own cases he proceeded in the latter manner.* However, notwithstanding these promising accounts, and the fact that plastic operations have sometimes been performed after the removal of cancer of the face, professedly simply with a view to remedy deformity, yet with results in respect of permanent cure inviting attention to M. Martinet's opinions, the unfavourable estimate formed of the practice by Zeis† has been realized. The plan has completely failed in Italy; the experience of Professors Baroni and Rizzoli‡ proving that reproduction occurs with all its usual phenomena, in spite of the best devised plastic operations.

(B.) *Of the operation as a means of prolonging life.*— The claims of the operation as a curative measure having been discussed, let us turn to its consideration as a method of prolonging life. It may, in fact, by possibility be true, that though reproduction inevitably occur, and lead to the eventual destruction of the patient,

* Gaz. Méd. de Paris, No. 42, 1834.

† Handbuch der Plastich. Chirurgie, S. 367.

‡ Bulletino delle Scienze Mediche, serie ii. vol. vii. p. 237.

yet that the mean duration of life, reckoned from the moment of development of the disease, will be greater in those who have, than in those who have not, been submitted to the knife.

The period of return of the disease ranges, it is commonly averred, between six months and three years, or even upwards; and the intervening months may be passed in tranquillity and hope. But the common opinion, as thus stated, is incorrect; many cases must exist in the memories of all who have witnessed operations for cancer on a large scale, in which relapse occurred at a much earlier period. In eighty-five of Benedict's ninety-eight cases of amputation of the breast, already referred to, death was *hastened* by the operation. From the experience of Dr. Macfarlane, (loc. cit. p. 417,) it appears that, of thirty-two cases, two terminated fatally from the immediate effects of the operation; and reproduction occurred in all the others, either in the integuments of the chest or in the axilla, within the following periods:

No. of Cases.	Period of Relapse.
9	Between 6 weeks and 3 months.
13	Between 3 and 9 months.
4	Between 9 and 12 months.
3	Within 24 months.
1	Nearly 36 months.

Whence it follows (calculating in the most favourable way for the beneficial influence of the operation, and setting aside cases in which the knife in itself kills) that the mean period of relapse is something less than eight months and a week. And it further follows, that the chances are (be it remembered, too, that Dr. Macfarlane's operations were executed under the most favourable circumstances) as seven to one that extirpation either proves fatal at once, or is followed by reproduction of the disease within twelve months.

But it might, perhaps, be still objected that, admitting the rapidity with which a fatal issue or reproduction follows, this affords no proof that the mean duration of life is not increased by operation. Facts have been supplied by M. Leroy d'Etiolles (loc. cit.) from which the value of the objection may readily be determined. From the first series of these facts, comparing the duration of life after the sixth year in persons operated on and not operated on, the subjoined table may be formed:

Total Duration of Life from outset of Disease.	Of 1172 Patients not operated on, there reached these periods.	Of 801 Patients operated on, there reached these periods.
Upwards of 30 years	18	4
From 20 to 30 years	34	14
From 6 to 20 years	288	88

Whence it follows, that the commencement of the sixth year of a cancerous disease will be reached by 13·2 per cent. only of those operated on, by 29·7 per cent. of those who have not been submitted to the knife. In other words, the use of the knife decreases by more than half the chances of surviving the sixth year of a cancerous affection.

From another series of facts we learn that the total duration of the disease averaged:

In Persons	Males.	Females.
Not operated on . .	5 years	5 years 6 months.
Operated on . .	5 years 2 months	6 years.

But even the slight mean excess of four months, which from this table appears to result from operation, does not really depend upon that cause,—but rather upon the rapid course of certain internal non-operable cancers.

The inferences hitherto drawn are still further corroborated by another series of facts relating to the comparative duration of life in 712 cases, between, on the one hand, the first appearance of the disease and the performance of the operation, and, on the other, between its performance and death. The facts may be exhibited thus:

Mean Period.	300 Males. Months.	412 Females. Months.	Both sexes. Months.
Between outset and operation	45	42	43½
Between operation and death	17	30	23½

Here, then, may be closed the inquiry into the efficacy of excision as a therapeutical measure. From the facts, figures, and inferences now brought forward, the conclusion is inevitable and imperative, that extirpation of cancerous growths with the knife can neither be regarded as a means of curing cancer, nor of prolonging the existence of persons afflicted with the disease. The accumulated experience of intervening ages, dispassionately scrutinized and fairly interpreted, pronounces the very verdict, that was upwards of two thousand years ago rendered by Hippocrates in his memorable Aphorism (p. 228). The lapse of centuries of civilization, has done no more, in respect of the question of operation, than furnish elements for *demonstrating* what the observant genius of one man had in an era of comparative barbarism so acutely *divined!*

(c.) *Of the operation for the relief of urgent symptoms.*—There are certain circumstances under which the presence of a cancerous tumor may from hour to hour prove the cause of death. Thus, carcinoma of the rectum, blocking up the outlet of the intestinal canal, causes solid and flatulent accumulation to such an extent in

some cases, that rupture of the bowel and fatal peritonitis may be momentarily apprehended. Here, excision of as much of the morbid mass as can conveniently be reached, is unquestionably indicated, provided special objections exist to the establishment of an artificial anus. Again, hæmorrhage recurs so profusely and pertinaciously in some cases of cancer, variously situated, that a growth may be excised as the sole means of preventing fatal loss of blood, though no shadow of hope be entertained of the operation proving eventually beneficial. These instances will suffice to illustrate the conditions under which an operation of the kind may be justifiably undertaken.

(D.) *Of the operation as a means of procuring a comparative euthanasia.*—In certain cases when the local phenomena and general influence of a cancerous tumor are such as to make existence a continued agony, and promise to render the passage to the grave one of extremest misery, excision of the mass may be resorted to as a palliative measure. If hæmorrhage, pain, abundance of discharge, debility, and sleeplessness have been rapidly wearing out the sufferer, a short respite is commonly insured by the measure; the addition of some brief period to life may be fairly calculated upon, and circumstances may arise in families, which would render even the reprieve of a week an inestimable advantage. Further, it is to be remembered, that in some cases of the most disheartening character (cases which, had they been permitted to run their own course, must, to all appearance, have terminated fatally in a few weeks) an operation, it is affirmed, has added several months, nay some years, to life. These, however, are occurrences of infinite rarity; to hope for their repetition in any particular case would be absurd, and to hold out a prospect of it to the sufferer utterly unjustifiable. And unless the patient be determined to submit to the knife with a full consciousness of the comparatively slight benefit he is entitled to expect from his submission, the operation should not be had recourse to: the surgeon may *yield* to the entreaty of the patient, but cannot conscientiously *advise* extirpation.

Dr. Mason Warren* urges the following argument in favour of operation: "In at least one-half the cases the disease re-appears not at its original seat, but the patient sinks away quietly under an affection of some of the internal organs, the nature of which is unknown both to themselves and their friends. They are thus saved from the painful and disgusting death that attends cancer, when

* American Edition of Art. Cancer, p. 175.

allowed to proceed in its natural course to a fatal termination." But, in the first place, cancer does not necessarily run the course here ascribed to it, as its very appanage; in the second, cancers are not unfrequently rendered greatly more destructive by operation; thirdly, Dr. Warren's estimate of the relative frequency with which the disease fails to return *externally*, appears to me certainly above the mark; and, fourthly, it is obvious that no code of ethics will justify the performance of an operation with the design of securing the relatively petty advantages mentioned, unless the patient know that these are the full amount of reward he is, under any circumstances, entitled by his sacrifice to hope for,—and unless he have been made to feel that by that very sacrifice he *may* be more completely and more irremediably deprived of them than ever.

(E.) *Of the operation as a means of satisfying the importunate desires of patients.*—Let us suppose a case where (no matter what be the motives of his judgment in the particular instance) the medical attendant conscientiously believes the operation contra-indicated,—is he justified, if importuned by the patient to remove the diseased growth, in yielding to the entreaty? This is a question which it would, perhaps, be presumptuous to answer for others,—each man may fairly in such a conjuncture claim the "right of private judgment." All that can be said is, that the knife should never be employed in a case of the kind, unless the patient have been fully informed of the conviction entertained as to the probable result. The dilemma is not an imaginary one. I have heard of instances, both in this country and abroad, where women, warned of its inutility, have nevertheless persisted in demanding the operation, and eventually endured with patience the sufferings it entails, sustained by the simple hope that it would add a few brief months to their existence, and enable them to accomplish some good for a beloved relative. M. Marjolin and Sir B. Brodie have met with examples of this touching sacrifice.

§ II. *Removal by ligature.*—It was formerly much the habit to remove these growths by ligature when attached by a narrow base, and Recamier is of opinion that carcinomatous vegetations are less prone to return when thus removed than when cut away. Where there is reason to dread obstinate hæmorrhage, as in the instance of circumscribed tumors in the rectum, this mode of operating has its advocates. In cases of cancer of the tongue, also, the operation by ligature is sometimes used, either alone or in combination with that by the knife. These are, however, exceptional cases; in all others

the knife is to be preferred, and is in the majority the only possible means of removing the entire disease.

As a preparatory measure to extirpation with the knife, ligature of cancerous masses has occasionally been had recourse to,—long since, for example, by Valsalva (p. 233), — where the size of the growth was unusually great. Sloughing of some parts thus reduced the general bulk of the tumor before the knife was put in requisition.

§ III. *Enucleation by means of caustics.*—Not only have potential cauteries been employed for destruction of exposed cancerous surfaces and of fungosities, but attempts have been made by their means to remove masses of new structure. Plunket applied his arsenical paste to the unabraded cuticle (combining ranunculus acris with the arsenious acid to remove that membrane), and produced sloughs of the investing skin and subjacent scirrhus. That such treatment has occasionally succeeded, it would be vain to deny; but the danger of absorption of the poison (the occasional fatal effects of which have already, p. 218, been referred to,) is so great, that the practice has ceased to have any advocates among educated men.

The chloride of zinc paste has been employed with the same views. Some years since Mr. A. Ure showed me a large non-ulcerated scirrhous tumor, which he had completely enucleated with this agent from the breast; and I have been recently informed that he is not aware of any relapse having occurred. But results so favourable are not always to be anticipated. Dr. Macfarlane "has employed this paste in four cases of scirrhous mamma; in two cases when the disease had returned after ablation, and in several cases of cancer of the lip, and in cutaneous cancer of old people." In the latter affections he succeeded in effecting a cure; but in the former, "although he destroyed large portions of the mamma, and obtained for a time healthy and firm-looking granulations, yet new tumors uniformly sprang up in the old site or its vicinity, and the general progress of the disease was *always accelerated.*"* Nor is the treatment without immediate and direct disadvantage. The application is attended with excessive pain, commonly requires to be frequently repeated, may give rise to febrile excitement, intense and durable, and was in two cases, treated by Dr. Macfarlane, accompanied with violent gastro-enteritis, — a circumstance assimilating its dangers to those of arsenic. Some persons combine with the chloride of zinc that of antimony,—a combination more rapid in its effects.

* Medical Gazette, June 2, 1838.

I have recently learned from Dr. Carswell that M. Moons of Brussels has successfully treated several cases of cancer by means of a caustic of which he has not disclosed the composition. A committee has been appointed by the Belgian government to inquire into the matter.

§ IV. *Removal by congelation.* — It is interesting to know, as a matter of history, that the proposal has been made to destroy cancerous tumors by freezing them ; I am not aware that the suggestion has ever been acted upon.

§ V. *Removal by the induction of sphacelus.*—The occasional fortunate issue of cases in which mortification had destroyed the morbid growth, led to the bold and hazardous proceeding of inducing artificial destruction of the kind by the inoculation of the matter of common or hospital gangrene. M. Rigal, surgeon to the Hôtel-Dieu at Gaillac, appears to have had recourse to this experiment, in one instance at least, with success of a very remarkable stamp. He made a small incision in the centre of a mamma (so much enlarged by an irregular, uneven, fixed, varicose tumor, that it measured thirty-one inches in circumference), and covered the place with lint soaked in gangrenous sanies. On the third day the wound inflamed, and exhaled a putrid odour ; gangrene made such rapid progress, that in eighteen days the entire of the enormous mass had separated ; four months and a half after, the wound had completely closed ; eighteen years later the lady was still living, and had never had a relapse.* However considered, this case must be admitted to be most curious ; but it is much more probable that the mass was an encysted than a cancerous tumor. The failure of the general health (which was extreme) does not invalidate this notion. Dussossoy successfully removed a cancerous tumor by the inoculation of the matter of hospital gangrene. The patient operated on was a male, aged fifty ; the entire mass separated on the nineteenth day. Such proceedings do not, however, deserve imitation.

Local treatment of reproduced cancer.—A few words require to be said on the subject of the management of cases where, either immediately, or at a more or less distant period after an operation, reappearance of the disease takes place externally. Such reproduction occurs either in the wound or cicatrix, the adjacent cellular tissue and skin, or in the lymphatic glands. Excision with the knife, destruction with caustic or compression, are the only active

* Robert, L'Art de prévenir le Cancer au Sein, p. 155.

local measures which can be put in force. Excision has been proved by sad experience to be almost invariably unavailing. Destruction with chloride of zinc paste will be much more advisable in the case of nodules seated in or close to the wound. Should the disease have formed in the lymphatic glands, both proceedings are useless. Whenever the reproduced substance is so situated as to be within the reach of compression, this plan of treatment should, I believe, be immediately employed.

CHAPTER VIII.

DEFINITION.

The logical definition of *a* cancer is expressed in the terms, *Infiltrating Growth.* Now it is neither possible, nor, if it were, would it be practically advantageous, to define on a similar plan the malady of which *a* cancer is simply the local evidence. But a concise general description of the affection, founded on all that has been hitherto established, will not be without its utility. Cancer, then, is a disease of constitutional origin, anatomically characterised by the presence of encephaloid, scirrhus or colloid, growths which, while they vegetate and decay in their primary site, influence in special modes the surrounding structures, and tend to spread by a process of dissemination through the system;—a disease liable to originate at all periods of existence, in both sexes, in all social conditions, in all climes, in towns and in rural districts; but becoming more and more common with advancing age, affecting females to nearly three times as great an extent as males, as rife among highly civilized populations, as it is rare among the comparatively barbarous, traceable in some instances to mental affliction, and in all, in ultimate analysis, to predisposition (hereditary or acquired);—attended by a peculiar group of general symptoms, its special cachexia;—habitually running a chronic course, yet occasionally assuming all the rapidity of progress appertaining to acute affections;—terminating, in the great majority of cases, when left to itself, by death, but in some instances undergoing spontaneous suspension or cure;—imperfectly amenable to treatment, either local or general, yet unquestionably yielding to such treatment in a certain proportion of cases; and incurable, except in the rarest instances, by the extirpation of any formation constituting the local anatomical evidence of its existence.

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PART II.

OF CANCER OF PARTICULAR PARTS.

I PROPOSE in this division of the work to describe cancer of the various organs, tissues, and parts, in which, with greater or less frequency, the disease presents itself in actual practice. The full consideration I have given the general history of the malady will obviously very materially lighten the task of describing the characters it presents, when infesting particular localities. And it is likewise plain that the disease will require to be most carefully described in those organs, where, from some special circumstances, its course and influences on the system swerve more or less widely from the general type of cancerous affections. It is for this reason that the description of the disease in some organs runs to a greater length than might, perhaps, seem warranted by their comparative importance.

I have already stated the particular cautions to be observed in undertaking operations for the removal of cancerous productions; I refer for the manual directions for their performance to works on Operative Surgery.

CHAPTER I.

CANCER OF THE DIGESTIVE ORGANS AND APPENDAGES.

SECTION I.

LIPS.

§ I. Without being very common, labial cancer is of tolerably frequent occurrence; the small quota of sixteen among 8289 deaths from cancer, ascribed to the lips in the Paris Registers, gives an imperfect idea of its real fatality, and obviously deceives as to its frequency.

§ II. The apparent mode of origin and progress of cancer of the lips is variable: the chief varieties in these respects may be described as follows:

(*a.*) Labial cancer may commence by infiltration of scirrhus, presenting the characteristic properties of this formation through the substance of a limited extent of the lip, and apparently underneath the skin at the junction of that membrane with the mucous surface. After a variable length of time, the skin, or more commonly the mucous tissue, gives way; the resulting fissure discharges a thin acrid fluid; this dries and forms a scab, which falls off, or is torn away accidentally, and is reproduced. Meanwhile the ulcerative process advances, at first slowly; the formation of regular scabs ceases, and fungous formations spring from the scirrhous basis. These are of the hard species; I have neither myself seen encephaloid structure produced in this situation, nor read of any instance in which it is alleged to have been so produced.—(*b.*) There is a class of cases in which (especially if the accounts of patients are to be accepted) a simple fissure or chap is the first unnatural appearance observed,—no induration of any kind being discoverable. This fissure resists all means employed to cause its closure; crusts form upon it, fall off, and are reproduced. Eventually hardening of the textures sets in, and the further progress of the malady is the same as that already described. Now, in such cases, proof is certainly wanting of the fact of formation of scirrhous substance being the very first pheno-

menon of the disease; but, on the other hand, the early absence of perceptible induration does not prevent its being possible that scirrhous blastema and cells may even then be sparingly deposited in the tissue of the lip.—(*c.*) The production of a cutaneous warty excrescence is, in certain instances, the earliest evidence of the disease. This excrescence possesses the anatomical characters, and runs the course of the cutaneous productions, to be elsewhere described (see Cancer of the Skin); it is frequently tinged with black colouring matter.—(*d.*) Dr. Warren (Op. cit. p. 342) mentions a case where the disease commenced by "a pustule, which, after bursting, left a scab:" the further advance of the disease is in no wise peculiar in such cases.—(*e.*) This is one of the situations in which the production of cancerous substance from a surface exposed by venereal ulceration has been most positively ascertained. The frequency of such origin of the disease has, however, been greatly exaggerated.

§ III. Whichever of these modes of origin occurs in any given instance, in proportion as the disease advances, the skin, mucous membrane, and labial glands form a prominent mass, which, combined with the fungous productions from the sore, produces an abundant slaver that constantly escapes over the edge of the lip, irritates and may excoriate the adjoining skin. The ulceration may spread over the entire cheek, and destroy even part of the external ear; or the morbid formation extend to the maxilla, as in a case observed by Mr. Travers, where an immoveable scirrhous tumor extended from this bone to the os hyoides, went through its stages with rapidity, and finally choked the patient while in the act of swallowing. The destruction has been known to extend even to the sternum. It was remarked by Bayle, and the observation has been confirmed by others, that, so long as the ulcer implicates the skin only, it remains comparatively superficial, but, when the mucous membrane is attacked, excavates deeply, destroying all the tissues of the part: this, of course, refers to cases wherein ulceration commences distinctly by the cutaneous surface. M. Velpeau* holds that cancer of the lips advances much more slowly, while limited to the parts covered by mucous membrane, than when it encroaches upon the neighbouring skin.

The salivary and the lymphatic glands become enlarged and painful; the latter especially may be infiltrated with scirrhus. General contamination of the system is comparatively rare; a remarkable in-

* Leçons Orales de Clinique Chirurgicale, tom. iii. p. 138. 1841.

stance of its occurrence, wherein the heart was the seat of numerous cancers, has been related by Mr. Coates.* M. Velpeau, too, refers to the case of a man who died on the ninth day after removal of a cancerous excrescence from the lower lip; though this man's general health, at the time of the excision, was in every respect perfect, hundreds, even thousands of cancerous nodules were found in the liver on post-mortem examination.

§ IV. There is nothing special in the intimate constitution of cancer in this situation. Gluge† examined the microscopical structure of a portion of ulcerated cancer of the lip and cheek immediately after its removal from the person of an old man. The entire mass contained innumerable juxtaposed and closely adherent cells, forming a soft, fat, tallow-like substance. Valentin‡ gives a figure of the minute structure of cancer in this situation; here cells with granular nuclei are pretty thickly set in a firm stroma, composed of parallel fibres. Müller in one, out of a considerable number of cases, detected the characters of the so-called reticulated variety of scirrhus.

§ V. Labial cancer, rather frequent among males, is singularly rare in the other sex. It almost invariably affects the lower lip, and seems not uncommonly to acknowledge as an exciting cause the irritation of a pipe or tobacco-juice. But the inadequacy of this irritation to produce the disease in a non-predisposed person appears from the consideration, as Mr. Travers excellently well observes, that, "of the number of smokers, the proportion of persons so affected does not exceed that of cancerous to sound persons." Rough and prominent edges of teeth act in a similar way.

§ VI. There is only one affection which may easily be confounded with cancer of the lip,—namely, *venereal ulceration with an indurated base.* I believe it will be admitted by all persons who have had occasion to observe much of diseases of this nature, that it is often impossible to determine from the local characters of the ulceration, whether this be syphilitic or cancerous. The history of the individual, the absence or presence of other signs of venereal taint, and the influence of mercurial treatment, must often decide the question. M. Velpeau records an instructive example of the fact. A young man had an excrescence on the under lip, possessing all the characters of a cancerous growth,—an ulcer covered with crusts, livid granulations, bleeding on the slightest touch,

* Med. Gaz. vol. xviii. p. 575. 1834.

† Anat. Mikroscop. Untersuchungen, Erster Heft, S. 136. 1838.

‡ Repertorium, 2ter Abth. S. 311. 1838.

springing from a hard and painful base; lancinating pains were felt in the part. The patient steadily denying having ever had syphilis, several surgeons in consultation agreed in regarding the disease as cancerous, and in recommending excision. Subsequently, the fact of venereal infection was admitted by the young man; and complete recovery followed an anti-venereal treatment.

Psoriasis labialis distinguishes itself from the crusted condition of cancer by its almost always extending round the mouth, by the fissures accompanying it, and by the true scales on the affected surface.

§ VII. Superficial cancerous ulceration of the lip, as that of the skin, may sometimes be successfully controuled by cauterisation. The best caustics for this situation are the acid nitrate of mercury and the chloride of zinc. The objections to arsenical applications in this locality are sufficiently obvious. If ulceration have spread deeply, the time for the advantageous use of escharotics has passed, and the treatment must be simply palliative.

It is matter of common belief, that the lip is one of the situations in which the excision of cancer may be undertaken with the strongest hopes of success. There can be no question that the prevalent notion on this point is an exaggerated one, and has arisen in consequence of syphilitic sores having been cut away as cancers. I have in some instances known the disease return, after apparently complete excision, in two or three months; and, in a case I saw operated on by Dupuytren in 1834, the progress and fatal issue of the affection were obviously hastened by the use of the knife. M. Velpeau gives a very gloomy account of his experience: even in the most simple cases of very limited ulceration, he has found the disease re-appear within three or four months, more or less, either in its original site or elsewhere. In the case just referred to in the last page, the knife evidently destroyed a patient, who might otherwise have survived for years.

Notwithstanding all this, it must be granted (see p. 235), that, when the diseased parts are completely excised, perfect cure sometimes follows. In what proportion of cases this fortunate issue arises, and by what circumstances its occurrence is rendered in more than an average degree probable, are points yet to be determined.

SECTION II.

GUMS.

§ I. The term "epulis" is habitually applied to all solid growths springing from the gingival membrane of either jaw. Cancerous epulis has commonly the characters of the scirrhous species; but encephaloid, it is said, occasionally forms in this situation,—a circumstance which must, at the least, be rare. The gums are also liable to become implicated in cancerous disease spreading from neighbouring parts.

§ II. Cancerous epulis, as epulis generally, is more common in the lower than the upper jaw. It may commence either in the front or back part of the gums, or between the teeth. It is said to originate usually towards the last incisor, or the bicuspid teeth; and certainly appears first, in the greater number of cases, at the line of reflection of the gingival membrane on the alveolus.

§ III. The disease commences, there can be little question, as an infiltration of the gum; but the process goes on irregularly, so that a tuberculated nodule is soon the result: I have never seen a scirrhous epulis in which this form was not apparent; the anfractuosities are sometimes extremely deep.

There is nothing special in scirrhous structure in this situation; it is dense, imperfectly vascular, and abounds in fibriform substance.

In size these tumors vary, as far as I have seen, between a pea and a nut; it is said they attain the bulk of a walnut sometimes, and, should encephaloid formation occur, dimensions much more considerable even may be reached.

§ IV. Ulceration eventually takes place; the discharge is peculiarly fœtid, and occasionally profuse; the sore fungates, and frequently bleeds. The disease destroys the soft parts, and may (but this is rare) extend to the substance of the bone; the submaxillary lymphatic glands become cancerous. Internal organs have occasionally been found cancerous in these cases.

§ V. Though not unknown in rather young adults, the affection is much more common in persons of advanced age, and in males than females. It does not originate through the irritation of carious teeth, unless in strongly predisposed persons.

§ VI. Lancinating pain is commonly complained of, and occasionally becomes excessively severe. The morbid mass interferes

with mastication, articulation and deglutition; and the disgusting condition of the mouth is a source of constant torture.

§ VII. From the *flabby, fungous productions* which sometimes form in the gums near carious teeth, scirrhous epulis will be distinctly known by its density, its tuberculated shape, its pale colour, sometimes the age and constitution of the individual, the local suffering, and the implication of the general health.—*Erectile epulis* is distinguished by the characters belonging to that kind of structure; it is the seat of pulsations which may almost always be felt, and sometimes even seen.—*Simple hypertrophous epulis* is with difficulty to be distinguished (except by its ready curability through operation) from the scirrhous species. The intimate structure of both requires closer examination than it has yet received.

§ VIII. The distinction of scirrhous from simple epulis is so imperfectly established, that experience can scarcely be said to have decided on the propriety of extirpation of the former, with or without an adjacent portion of jaw. Should the disease be encephaloid, have acquired bulk, and have extended towards the fauces, excision of the mass is utterly useless, as a curative measure.

SECTION III.

TONGUE.

§ I. The tongue holds a tolerably high rank in respect of the frequency with which it becomes cancerous: in 36 of 8289 fatal cases of the affection, the main disease was, according to the Paris Registers, seated in that organ: this proportion gives it the twelfth place among the different tissues and organs.

§ II. Of colloid cancer of the tongue I have met with no example. The fungous excrescences springing from an ulcerated cancerous surface sometimes exhibit the encephaloid character, as does also the carcinomatous substance occasionally forming in erectile growths: but the disease does not, so far as I have seen or ascertained, assume this character *ab origine*. Lingual cancer is in other words almost invariably of the scirrhous species.

§ III. Cancer of the tongue may commence in any of four distinct ways: 1, As a small rather circumscribed, but somewhat knotted and irregular tumor, generally seated in the anterior part of the organ midway between the raphe and one edge, and rarely extending beyond the middle line; 2, or as a small excrescence, which eventually (as is said, but of this I have no expe-

rience and some doubts) in some instances becomes pedunculated; 3, or cancerous deposition in rare cases complicates simple ulceration, produced, for example, by the contact of a carious tooth; 4, or, in still rarer instances, erectile tumors become the seat of such deposition.

§ IV. In either case the surface ulcerates (the mass may have acquired such size as to extrude the tongue from the mouth before this change occurs) and presents the usual phenomena and appearance of carcinomatous ulcers, the fungous formations sometimes assuming the cauliflower shape and attaining large dimensions. The progress of the disease is in some cases extremely rapid: Dr. Warren records an instance in which eleven weeks sufficed to change a "small hard lump on the edge of the tongue into an extensive ulcerated fungus, rising a quarter of an inch above its surface, and covering half its breadth." The ulceration may spread to the buccal and gingival mucous membrane, while the non-ulcerated part becomes covered with warty vegetations. The sublingual and submaxillary lymphatic glands undergo the ordinary changes: in a case observed by Mr. Travers they formed the base of the tumor, while a cauliflower fungus occupied half the tongue and covered the lower jaw.

Development of cancer in distant parts is not one of the usual concomitants of the disease in this organ.

§ V. Acute pain is not a constant symptom; there is generally an aching sensation experienced, varied occasionally by sharp pangs darting in the direction of the ear. The necessity for constant sputation forms one of the most distressing concomitants of the disease: and at night the accumulation of the discharge interferes with the patient's rest by exciting cough. The secreted matters are swallowed in large quantities, and, as is mentioned by Bégin, sometimes glide into the respiratory passages; this writer attributes the constitutional suffering in some measure to their deglutition. The mechanical action of the growth, particularly when it attains large size, produces pain and difficulty in articulation and in the mastication and deglutition of food, gradually increasing until the performance of these functions becomes an impossibility. As an evil of a minor kind, the jaws are often unconsciously closed on the enlarged organ, which is very painfully compressed.

The cachexia is frequently exhibited in an intense degree; and the sufferer is commonly cut off by its progress. When the diseased part has been excised, reproduction of cancerous sub-

stance either in the tongue itself, or in the arches of the palate, &c. hastens the patient's destruction.

§ VI. Mr. Travers fixes upon strong and healthy males of the age of forty and upwards as the most usual subjects of lingual cancer; the disease is, however, observed not unfrequently in the other sex, and in much younger persons.

Respecting immediate causes it may be observed, that, in individuals possessed of the necessary constitutional predisposition, the irritation of a diseased tooth, producing at first simple ulceration, may be followed by carcinomatous development.

§ VII. Cancerous disease of the tongue is liable, both before and after the establishment of ulceration, to be confounded with certain other affections.

(1.) I have seen a *simple induration* of one side of the base of the tongue, differing from the carcinomatous by its situation, the total absence of pain, and the unaltered state of the general health. —(2.) Mr. Travers describes a *globular tumor* of the tongue seated deeply in its substance, distinguishable by its being very uniform and unyielding on the surface, and like a marble in point of size and to the feel. He has invariably found this tumor disappear under the use of alkalis and tonics. Having never opened it, or examined its structure, he is only enabled to presume it to be a cyst containing an albuminous fluid. Mr. Cæsar Hawkins* rather regards this affection as a scrofulous abscess, because he has seen slow suppuration take place in connexion with it, the pus discharged being thick and creamy.—(3.) *Simple ulceration*, generally depending upon the irritation of accumulated tartar or of a carious or prominent tooth, is usually to be distinguished by the rapid cure which follows the removal of the irritating agent. There are sometimes several such ulcerations, whereas cancerous destruction occurs in but one place; they also want the extensive basis of solid induration discoverable in the latter affection.—(4.) *Syphilitic ulceration*, accompanied with induration, so strongly resembles the scirrhous species, that it is occasionally next to impossible to distinguish them. The former is generally more extensive, however, and the hardening which surrounds it less marked, and less circumscribed. The syphilitic ulcer furnishes comparatively little discharge, and is deficient in the firm everted edge and sprouting fungi of the cancerous species. The action of mercury might be supposed to afford aid in the diagnosis; but, as is correctly re-

* Medical Gazette, June 21, 1844.

marked by Bégin, that mineral is sometimes decidedly injurious, where no doubt can be entertained of the venereal nature of the ulcer. The history of the patient, and the absence or presence of syphilitic affection of the skin, are of deep importance in the inquiry. Syphilitic ulcers of the tongue are, in the vast majority of cases, secondary, and consequently the process of inoculation will not demonstrate their specific character; but, if primary (as the experience of the Paris hospitals proves they may sometimes be), the process mentioned will (as I have seen exhibited by M. Ricord) remove all doubt as to the true nature of the malady.—(5.) The *fissured or dyspeptic ulcer* of the tongue, which often originates in psoriasis, may, as stated by Mr. Cæsar Hawkins, much resemble cancer, if there be a deep fissure with elevated fungous margins cutting the organ in portions and causing profuse discharge of saliva; the similarity will be still stronger, if there be prominence with indurated surface and irregular, firm, warty excrescences. In this affection, however, he observes, the hard basis of cancer does not exist; "the fissure is frequently in the middle line" [I have however seen it distinctly marked at the edge], "while in cancer the disease is generally limited to one side of the raphe; the rest of the tongue is chapped and irregular, while in cancer two separate parts are very seldom diseased; and there are many signs of irregularity of the digestive organs present."—(6.) Dr. Warren describes an *enlargement of the mucous glands*, commonly occurring on the side of the tongue, with a red fungous appearance, but differing from cancer by its being "sensitive, not painful, and unattended with real ulceration or thickening of the tongue."—(7.) *Hypertrophy of the mucous membrane* sometimes gives rise to irregular fissured elevations on the surface of the tongue. Mr. Mayo (Outlines of Pathology, p. 267. 1835) observed a condition of this kind in the tongue of a young man; it had existed for three years, affected the middle half of the left side of the upper surface of the organ, and produced an elevation of from a quarter to a third of an inch. The surface was here moist, soft, and of a reddish-grey colour, the part free from pain or soreness, and deprived of the sense of taste. The swelling lessened under the application of hydrargyrum cum cretâ and nitrate of silver. The patient was phthisical,—a circumstance which might, on the principle elsewhere explained, prove useful in the diagnosis of similar cases.—(8.) *Hypertrophy of the tongue generally*, a most rare malady, will be distinguished by the absence of pain, the equable enlargement of the organ, and the satisfactory state of the general

health.—(9.) *Erectile tumors** of the surface of the tongue are to be known by the peculiar characters of that structure; their liability to become the seat of cancerous formation should not be forgotten.

§ VIII. It has been the habit to regard removal of the diseased parts as absolutely indicated in cases of cancer of the tongue. Circumstances may arise in which the local palliation and constitutional treatment of the disease shall cease to satisfy the patient, or suffocation may be threatened from the increasing size of the organ, or the hæmorrhage proceeding from the part and the torturing pain, of which it is the seat, may be evidently fast drawing the patient's existence to a close: the operation may then become warranted, but as a *curative* measure experience says nothing in its favour. Failures are, as is usual, ascribed to delay in the use of the knife; Mr. Travers has only known one case operated on in an advanced stage, in which a relapse did not occur within a twelvemonth; and there is certainly a special reason for early operation in the instance of this organ, namely, the greatly increased difficulty in the management of the bistoury, when the disease extends deeply towards the base. In the only case related by Dr. Warren, the affection had re-appeared within two months after operation: it is fair to add, however, that the lymphatic glands were affected in this instance. In a case recently published by Mr. Cæsar Hawkins, the disease had existed but two months, and no gland was even swollen, when that surgeon removed the mass by ligature; yet, in five weeks after this proceeding, the cancer had re-appeared in both arches of the palate with every promise of a rapid progress. As the general result of his observation, Mr. Hawkins acknowledges his inability to affirm "that he has himself seen a *single operation*, which was not followed shortly by a return of the disease."

SECTION IV.

HARD PALATE.

Cancerous growths, especially of encephaloid species, sometimes originate in the dense structure of the hard palate. Thus seated, their common tendency is to spread backwards towards the pharynx, or to perforate the floor of the maxillary sinus and vegetate in the interior of that cavity. Such is obviously the origin of some formations spoken of as cancerous tumors of the antrum; and with the latter indeed their history is practically connected.

* Brown; Lancet, March 30, 1833.

SECTION V.

SOFT PALATE AND UVULA.

Of cancer originating in these parts, I have neither seen a distinct example, nor found any such recorded. In certain cases, where the pharynx and soft palate are implicated, it is perfectly possible that the affection may have originated in the palate, or that this part may, at least, have been the seat of separate formation; but I know of no evidence of the fact. I have never known the uvula wholly destroyed, but have seen it in a great measure removed by cancerous ulceration. Dr. Monro III^us^ * has seen the lower lip, uvula, and pharynx of an old lady in a scirrhous state.

SECTION VI.

TONSILS.

§ I. Enlargement of the tonsils, depending upon infiltration with simple induration-matter, coupled with a certain amount of hypertrophy of their proper tissue, is known by daily experience to be a condition of most common occurrence. This mode of morbid alteration has frequently been spoken of by writers under the title of scirrhus, and the idea thus engendered that cancer of those organs is rather common; the disease is in point of fact extremely rare. Three of 8289 deaths from cancer are referred in the Paris Registers to these organs.

§ II. It is generally believed, that, when cancer does occur in this situation, it exhibits the characters of the scirrhous species; the observations just made account for this notion, which is far from satisfactorily established. Cases of encephaloid disease of these glands, though unquestionably rare, are probably not much more so than of true scirrhus.

In a man aged seventy-five, having an enormous encephaloid growth in the right thigh, with similar disease of the inguinal, lumbar, and præ-vertebral lymphatic glands, Lobstein† found both tonsils much swollen, and "converted into cerebriform matter." The man died from dysphagia and suffocation.

A man, aged sixty, began to suffer from dysphagia and dyspnœa; M. Caillot‡ on examining the throat found the right tonsil

* Morbid Anatomy of the Gullet, p. 325. 1811.

† Anatomie Pathologique, tom. i. p. 429. 1829.

‡ Lobstein, loc. cit. p. 430.

greatly enlarged, and separated from it with the finger a mass of encephaloid, as large as a small nut. After two months of misery from dysphagia and dyspnœa the patient died; both tonsils formed tumors of some size and encephaloid aspect; the epiglottis, larynx, and lymphatic glands of the neck were similarly diseased.

In speaking of cancer of the lymphatic system I shall again have occasion to refer to the case in which Dr. Carswell discovered the following appearances: "The amygdalæ, formed entirely of cerebriform matter, presented a pale yellow colour tinged here and there with red specks, produced apparently from the rupture of minute blood-vessels. They had also lost that characteristic appearance from which they derive their name, having become almost perfectly smooth, from the accumulation of the cerebriform matter, and the distension of their envelope."

§ III. The therapeutical precept on which practitioners are accustomed to act in respect of the tonsils is, that removal of these organs should be effected, if, resisting ordinary discutient and alterative treatment, enlargement continue to increase: in as much as, if they be affected with simple induration, their removal is in every point of view advisable; and if they be really the seat of cancerous infiltration, this may extend backwards into the pharynx and implicate structures placed beyond the easy reach of instruments. I conceive that the principles regarding the general inadmissibility of operation, elsewhere laid down, are not so strictly applicable in the case of the tonsils as of numerous other parts: the difficulty of distinguishing simple from scirrhous induration constitutes one of the objections to their literal application. On the other hand it is obvious, that, when general taint of the system exists, no proceeding of the kind is justifiable, unless as a means of warding off imminent death from suffocation.

SECTION VII.

SALIVARY GLANDS.

§ I. The salivary glands are rarely affected with scirrhus or encephaloid, and colloid cancer has not been observed in these organs. Of the numerous cases reported by writers as examples of cancerous disease of the parotid gland, there are but few indeed in which it is not highly probable—in the majority this is certain—that the cellular tissue or lymphatic glands of the neighbourhood were the real seat of the morbid formation. Tumors thus constituted press upon the parotid, and reduce it by gradual

absorption to a thin lamina, which is easily overlooked in the wound, resulting from extirpation of the morbid mass.

Secondary scirrhous enlargement of the submaxillary and sublingual glands, however, is not of very uncommon occurrence in the course of, or after, the removal of cancerous disease of the lip, adjoining skin, or tongue. It is certain, also, that scirrhus and encephaloid both occasionally originate in the parotid.

§ II. The disease runs its ordinary course in this gland, nor is there any particular point to be noticed except the effects of implication of the fifth and seventh pairs of nerves. In a case observed by Magendie, "there was complete loss of sensibility in the corresponding side of the face, destruction of vision in the eye of that side, ulceration of the cornea, insensibility of the organ, not only to light, but under the contact of foreign bodies, deviation of the mouth to the opposite side, &c."*—A soldier, aged thirty-four, observed by M. Hudellet,† had a tumor on either side extending from the parotid region to the larynx. Each of these growths, equalling in bulk the head of a new-born infant, filled the place naturally occupied by the corresponding parotid gland, of which no trace was discernible. The new substance was of homogeneous lardaceous aspect. The only other organ affected was the heart. (See Cancer of the Heart.)

§ III. The parotid and submaxillary glands thus affected have been made the subject of operations. One of the most remarkable performances of this kind on record was achieved in 1823 by Béclard: the parotid was here indubitably affected with scirrhus.‡ But the general verdict against such procedures has been pithily pronounced by Mr. Mayo,—"the removal of the gland is useless." §

In a previous chapter (p. 204) I have made reference to the remarkable success recorded by MM. Magendie and Hosack, as having followed ligature of the carotid in cases of this description.

SECTION VIII.

PHARYNX.

§ I. The Paris Registers give a quota of 4 deaths to the pharynx among 8298 caused by cancer. Pharyngeal cancer is certainly rare.

* Lectures on the Blood; Lancet, Nov. 17, 1838.

† Cruveilhier, Anat. Pathol., Livrais. xxix.

‡ Arch. Gen. de Méd., Jan. 1824.

§ Outlines of Pathology, p. 274. 1835.

§ II. Scirrhus of the infiltrated form is the species of cancer most commonly observed in the pharynx; cerebriform growths, except in the shape of fungating masses, from an ulcerated basis, have been more rarely met with in this situation. Scattered nodules of scirrhus are of infinitely rare occurrence; I doubt, indeed, that preparations said to exhibit this state are otherwise than examples of fibrous growths.

§ III. When examined at an early period of its course, scirrhus of the pharynx usually presents itself as a hard imperfectly circumscribed mass, occupying a variable extent of the submucous tissue of the tube, and invested by the mucous membrane, which in the early stages retains to all appearance its normal characters. The swelling or tumor (for, from the abundance of infiltration, distinct and irregularly rounded elevation, perceptible sometimes even externally, is produced) may be pressed, unless its mucous surface be accidentally inflamed, without exciting pain. Eventually the surface ulcerates, and the opening presents the characters elsewhere assigned to cancerous ulceration, gives rise to the same hæmorrhage and fœtid discharge, while fungating growths, with the tendency to the pyriform and cauliflower shape, sprout from its edges or centre. The diseased mass is now tender to the touch. The destructive process spreads in different directions: in a case I had an opportunity of observing at the Hôtel-Dieu in 1835, the base of the tongue, the velum palati, and part of the epiglottis were destroyed; in other instances the œsophagus, the posterior region of the nares, &c. suffer. The cervical glands undergo the changes observed in cancerous disease.

§ IV. It would appear that the morbid matter in many cases accumulates to some amount before it excites any very serious symptom; a sensation of fullness in the affected region, and trifling difficulty in swallowing, have often existed for some time before they become sufficiently troublesome to alarm the patient. But the supervention of pain at length rouses his apprehensions; and the pharynx, examined at this period, generally presents the incipient changes above described. The dysphagia increases; the ingesta, both solid and liquid, frequently return through the nostrils in the efforts to swallow; and deglutition at length becomes impossible without the aid of instruments. Before this, ulceration has usually set in, and the discharge from the sore is rejected from time to time with a painful regurgitant effort, evidently different in nature from that of vomiting. Part of the sanies, however, is swallowed, or gravitates into the stomach, where its

presence excites nausea, and sometimes, it is said, a burning sensation. The extension of the disease to the larynx is announced by a change in the characters of the voice, which rarely, however, terminates in complete aphonia. The posterior nares are sometimes obstructed with fungating productions; in this case, according to the remark of Bayle, there is dyspnœa. Sir C. Bell and Mr. Travers speak of "difficult breathing, frequent spasms, and alarms of suffocation," as constituting part of the symptoms; under these circumstances the air-passages must be obstructed, either directly or indirectly, by the volume of the mass in the pharynx. Here, as in other regions, hæmorrhage may be the very first symptom noticed. In the case I observed at the Hôtel-Dieu, a profuse discharge of blood took place, before any pain or difficulty in deglutition had been experienced—a fact placed beyond all doubt by the uniformity of the patient's replies under repeated questioning. The effusion of blood frequently recurred, and finally proved the cause of death: an opening of small size was discovered in the internal maxillary artery. The ordinary mode of death in cases of pharyngeal cancer is however by inanition; the sufferer falls into the last stage of marasmus, and exhibits with its usual characters the cancerous facies and discoloured skin. The disease may prove fatal by extending to the larynx, as in a case related by Sir C. Bell.*

§ V. *Simple hypertrophy* of the walls of the pharynx is so rare an affection, that I have not observed, nor been able to find recorded, a sufficient number of cases for the purpose of ascertaining the points by which it is distinguished from carcinomatous infiltration; yet the importance of the distinction for the physician's reputation is obvious. Simple induration, with thickening of the submucous tunic, will entail the same dysphagia as cancer, and, as I have had an opportunity of observing, lead to the rejection of the food through the nares. The effects of treatment and the ulterior progress of the disease should be watched for a time, before a decisive opinion is ventured upon.—*Sacculation of the walls of the pharynx*,† whether constituted by pouching of both tunics, or by a dilated portion of the mucous membrane which has made its way through the fibres of the muscular coat (a condition incorrectly spoken of by some writers under the title *hernia*‡), is accompanied with difficulty of deglutition; but the facility with which

* Surg. Obs., vol. i. p. 53.

† See art. Ectopia, Cyclopædia of Surgery, vol. ii. p. 60.

‡ Ludlow in Med. Obs. and Inq. vol. iii.; and C. Bell, loc. cit. p 66.

instruments may generally be passed* will distinguish the case, at least in the greater number of instances. Sacculation is, besides, an excessively rare affection.—The distinction of certain *venereal and scrofulous sores* from cancerous ulceration is to be established by the commemorative symptoms, the constitution of the subject, the state of other organs, and, commonly, the effects of treatment. Inoculation of the discharge will not settle the question of the syphilitic or cancerous nature of a pharyngeal sore; for venereal ulcers are in this situation secondary, and the matter of such surfaces does not, as already mentioned, produce chancre by inoculation.— Of *simple ulceration* of the lower part of the pharynx proving fatal, Mr. Mayo† refers to an example. The dysphagia in such a case cannot ever be carried to the extent observable in cancer. Besides, the affection must be infinitely rare.—*Cellular or cellulo-fibrous pedunculated growths* (polypi) sometimes form in the pharynx: cancer does not assume this shape in this situation, is more painful, and affects the general health much more seriously than these productions.—*Enlargement of the cervical vertebræ* may cause permanent dysphagia; but will be easily recognised by examination with the finger.—Dr. Hodgkin‡ refers to a case in which an encephaloid mass occupying the lower part of the pharynx, and extending in some degree to the œsophagus, occasioned great dysphagia, formed a considerable tumor in the throat, pushed forward the larynx, gave rise to swelling of the adjacent parts, moved during the act of deglutition, and had some pulsation communicated to it from the carotids. The diagnosis was obscure, until the nature of the affection was revealed by the ejection through the mouth of some encephaloid matter.

§ VI. Palliation of suffering is all that can be hoped for from treatment in these distressing cases. Pain may be relieved by emollient and narcotic gargles; the fœtor and nauseous character of the discharge lessened by the use of the chlorides in the same way. The obstruction to deglutition is sometimes so considerable, and this for a length of time before death, that the use of the œsophagus-tube is required. But whatever delicacy and gentleness be observed in the introduction of this instrument, its repeated

* Rokitansky (Medicin. Oesterrh. Jahrbücher, B. xxi.) relates a case of this kind, (remarkable in many points of view,) in which the œsophagus-tube could not be introduced, probably on account of the point always making its way into the pharyngeal pouch or diverticulum, which measured three inches in length.

† Outlines of Pathology, p. 280. 1835.

‡ Morbid Anatomy of the Serous and Mucous Membranes, vol. ii. p. 231. 1840.

passage causes much irritation; this is in some instances so violent, and accompanied with such copious hæmorrhage, that persisting in its use would only hasten the unfortunate sufferer's end: in cases of this kind the tube may be left permanently in the canal; its presence thus is not productive in *some* persons of nearly so much irritation. Hæmorrhage may be restrained by astringent gargles.

Bégin and writers of the Broussaisian school of course recommend the direct application of leeches to the diseased part: chronic inflammatory induration may be thus removed, but there is no proof to be found of their *curative* efficacy in carcinoma of this region. Irritation and dysphagia may be relieved, however, by local depletion even in cases of cancer.

Ulcerated surfaces may be beneficially modified by superficial cauterisation, especially with the nitrate of silver; I am not acquainted with any facts entitling the plan of destroying the morbid substance in this situation by potential caustics to serious consideration.

As a final resource, where obstruction to deglutition has become complete, nutriment must be administered in the form of enema, or perhaps of baths. Œsophagotomy might be performed (as will be further referred to in a coming page), and the patient fed through the artificial opening.

Excision has been but very rarely attempted; nor does the operation seem by any means a warrantable one. Setting aside for a moment the general objections to ablation of cancer with the knife, the difficulty of making out the exact boundaries of the diseased mass, and of removing every particle of morbid substance discovered, constitutes an insurmountable barrier to its success. Nor should it be forgotten, that, as Dr. Warren remarks, "a hæmorrhage might present itself from the deep parts involved, which no art could suppress," were an operator found bold enough to push the knife amid structures removed beyond the reach of sight, and almost touch.

SECTION IX.

ŒSOPHAGUS.

§ I. Thirteen of 8289 deaths from cancer in Paris are ascribed in the Registers to the œsophagus.

§ II. Cancer of the œsophagus occurs most frequently at the upper end of the canal behind the larynx, most rarely at its middle part, and may, as in a case figured by Baillie, occupy nearly its

entire length and circumference. Infiltrated scirrhus deposited in a stratiform manner, encircling the walls of the tube more or less completely, and causing gradual diminution of its calibre, is the most common condition in which the disease presents itself. Distinct scirrhous tumors are comparatively very uncommon; tuberiform encephaloid still more so. Pedunculated soft growths from a scirrhous basis are sometimes observed. Infiltration commences in some instances in the mucous, in others (by far the more common) in the sub-mucous, tunic.

Distant organs are rarely implicated in cancerous disease when the primary affection is seated in the œsophagus. Monro III^us^ refers to a case where this tube, the stomach, diaphragm, pancreas, and uterus were scirrhous. I have known the uterus affected; but, whether secondarily or not, I am unable to affirm.

§ III. The formation of cancerous matter in this region is, according to Bayle, commonly preceded by pyrosis, hiccup, and transient pain in the fauces: it is certain, however, that suddenly developed dysphagia is frequently the first sign of its existence. The dilated œsophagus sometimes forms a tumor perceptible externally; and this has actually been mistaken for an enlarged thyroid gland. The *nature* of the symptoms of œsophageal cancer is the same as when the disease is seated in the pharynx; but, as the coarctation is seated lower down, the first stages of deglutition are accomplished naturally. Subsequently, if the stricture affect the upper end of the canal, the greater proportion of each mouthful of food at once regurgitates: if a lower part, three or four mouthfuls pass with facility, and the accumulated matter is then gently expelled by the action of the muscular fibres. These occurrences are at first only occasional—a circumstance which tends in some cases to keep alive the hope that the patient suffers from spasmodic stricture only. But the dysphagia eventually becomes permanent (it may, almost to the close of existence, be attended, in addition, with spasmodic constriction of the pharynx), and the obstruction increases to such a degree that not a particle of solid or even liquid food reaches the stomach. Sometimes a dilated pouch (the mucous lining of which is studded with ulcerations) forms above the obstruction—here the food accumulates, and is rejected, commonly with laborious effort, sometimes without either pain or difficulty, after a variable lapse of time. The ingesta are under these circumstances usually mixed with glairy mucous matter, which is, according to Bayle, never tinged with brownish fluid, and is thus distinguishable from the substances vomited in cancerous disease of the stomach. In a remark-

able case related by Mr. Purton* exemplifying this condition, the patient, a man aged forty-three, had for twenty years been subject to attacks, lasting three weeks or more at a time, during which no food directly reached the stomach. Examination after death disclosed a huge pouch extending from two inches below the pharynx to the cardia, and containing two measured quarts of grumous matter and fluid: the cardia was pervious, but much contracted. This person had been in the habit of allowing the ingesta to accumulate in the sac for hours or even days; when it was completely filled, he made efforts at swallowing, by which the contents were forced on to the stomach. For the last six weeks of his life, however, his sole sustenance was derived from nutritious injections.

The ingesta accumulated in the œsophageal pouch are not ever, perhaps, wholly rejected. The patient is even sometimes conscious of the slow filtration of some portion of them through the constricted part into the stomach. Mr. Howship refers to a case in which the patient was enabled, by pressing on both sides of the neck, to force the accumulated matter, in part at least, below the constriction. But, even when the wretched sufferer has succeeded in swallowing some morsels of food, he is far from being sure of benefiting by his success: the stomach sometimes rejects all that enters it, and the œsophagus allows the passage of vomited matters much more readily than of those which reach the stricture from above downwards. Whether, as was contended by Mr. Purton, the dilated œsophagus be capable of effecting a sort of chymification of the ingesta, is a question open to the investigations of physiology; to admit the affirmative is by no means repugnant to reason, and it has been asserted in some cases, as will by-and-by be seen, that the matters found there after death have exhibited the physical characters of chyme.

Dysphagia is first experienced in swallowing solids; subsequently liquids cannot be forced past the obstruction. A gurgling sound of peculiar character sometimes accompanies the deglutition of fluids, doubtless in consequence of air being swallowed at the same time, or of some gas being formed amid the contents of the œsophageal pouch.

The progress of the disease is accompanied with pain; the seat of which indicates, in some rare cases, with much precision, that of the morbid formation. In others the suffering is referred to the entire length of the canal, or is felt in the back, in the shoulders, or in

* Med. and Phys. Journ., vol. xlvi. p. 540. 1823.

the arms. The extension of the pain in this manner is by Bayle supposed to depend on the formation of adhesions between the cancer and the adjacent parts. Obstinate hiccup is not unusual. Deglutition is frequently accompanied with pain shooting along the fauces to the base of the skull, and through the Eustachian tube to the ear. It is a curious fact that the spasmodic dysphagia above referred to, which is superadded to the permanent, may disappear towards the close of existence. But this is not the only instance of apparent improvement in the condition of patients which to the practised clinical observer signifies the approach of death; and I scarcely know a point more worthy of deep investigation than the nature, causes, and influence of these painfully deceptive phenomena.

When ulceration sets in, and especially if it make extensive progress, the mechanical obstruction to deglutition is of course lessened; yet the patient gains but little by the change, for the tendency to spasm proportionably increases. In some cases the affection runs an intermittent course, — the remissions of suffering and dysphagia being so complete from time to time, that it becomes difficult to believe the patient really afflicted with incurable organic disease. It is most important for his own sake that the physician bear this fact in mind.

§ IV. Persons afflicted with cancer of the œsophagus usually perish, as those whose pharynx is similarly diseased, by inanition: M. Marquet* refers to a case in which the patient, a female, who weighed a hundred and sixty pounds when in health, weighed only twenty-seven when she died, — a painful exhibition of tenacity of life. The cachexia is commonly well established. Such patients are exposed to the chances of severe hæmorrhage. Perforation of the diseased tube, with effusion of the ingesta into the mediastinum, determining an abscess in that region; the establishment of a communication between the œsophagus and the larynx,† trachea,‡ bronchi, pleura, or pulmonary tissue, not very unfrequently shortens the patient's days. Yet the existence of such communication with the lung is not incompatible with the continuance of life: M. Moutard-Martin§ has published a singular case wherein a large cavity, formed in the lung (though partly empty, it contained six ounces of whitish-grey grumous matter), communicated freely with the œsophagus; the food, entering into it with facility, regularly accumulated in

* Traité Pratique de l'Hydropisie, p. 171. 1770.

† A. Monro, Diss. de Dysphagiâ. Edinb. 1797.

‡ University College Museum.

§ Bibl. Méd., tom. xxxiv. p. 85. 1811.

this adventitious stomach. M. Aussant * has recorded a case in which death occurred from implication of the medulla spinalis,—the vertebræ, intervening between an ulcerated cancer of the œsophagus and that structure, being completely softened.

§ V. The causes of cancer of the œsophagus are those of the disease in general. I am simply desirous of observing here, that an organic stricture, which originally depends on simple induration of the parietes of the tube, may in predisposed persons become complicated with deposition of cancerous substance,—an additional motive for employing all possible means for the cure of the former affection.

§ VI. Among the diseases simulating carcinomatous contraction is *spasmodic stricture*, an exceedingly rare affection, but one capable of temporarily obstructing deglutition quite as completely as the former. The sudden occurrence of the complaint, its induction by mental causes or by adjacent irritation, its almost constant accompaniment by nervous and hysterical symptoms, and the success of antispasmodic and dilating treatment, sufficiently characterize this species of dysphagia; sudden supervention of the symptoms is not, however, conclusive of the spasmodic nature of the affection.—*Spasmodic contraction of the diaphragm* may give rise to very similar symptoms by producing tight embrace of the lower end of the œsophagus. This is a state purely hysterical.—The converse form of dysphagia from *paralysis* of the muscular tunic may be recognised by the absence of pain, the facility with which a probang may be passed into the stomach, the fact that solids are more easily swallowed than liquids, and large masses of ingesta than small pieces of food; the history of the case will further remove the chance of error.—*Dilatation* and *sacculation* of the œsophagus (states which, especially the former, may be in some measure congenital) are to be distinguished by the facility with which a probang may be passed, and the comparative excellence of the general health. Of general dilatation, with hypertrophy of the entire length of the œsophagus, Rokitansky† narrates an interesting case: the patient, a man aged twenty-six, had suffered for nine years with nausea, hiccup, vomiting, and constipation; he died with diarrhœa and incontrollable vomiting.—Chronic inflammation leading to *hypertrophy* and *induration* of the walls of the œsophagus is an affection of less common occurrence than has been supposed by some writers, and originates most commonly as an effect

* Diss. sur les Squirrhes de l'Estomac, Paris.

† Medecin. Oesterrh. Jahrb., B. xxi.

of the ingestion of poisons; in this case the history of the individual will prevent error.* A patient, observed by Bayle, perished some months after swallowing nitric acid; two or three inches of the lower third of the œsophagus were so contracted, that a quill could scarcely be passed through it; the walls were in a state of chronic hypertrophy with induration, which differed from scirrhous infiltration in wanting its homogeneous shining and semi-transparent aspect. In other cases where the affection has followed the permanent sojourn of foreign bodies (as pins, fish-bones, coins,) in the œsophagus, or the action of simple irritants on its coats, as of scalding hot water, &c., the history of the individual will similarly guide the physician in his diagnosis; but it must be confessed that the absence or presence of cancerous infiltration cannot by any means be always affirmed with safety. The constitution of the patient, and the possibility of hereditary taint, must be taken into account.—The contraction of plastic exudation-matter thrown out in the process of cicatrisation of surfaces, ulcerated or sphacelated from any of the above causes, is in itself sufficient to produce extreme constriction of the tube. In speaking of cancers of the Rectum I shall return to this point.—A curious case of *simple constriction* of the œsophagus, which appears to have been *congenital*, is related by M. Cassan.† The diameter of the tube was reduced to a French line, yet there was not the least morbid change of tissue; the lower part of the pharynx formed a huge pouch containing chymous matter. The subject of this disease had not been seriously incommoded by it until the last year of his life, lived to about the age of seventy-seven, and had generally enjoyed excellent health: these circumstances would have distinguished his malady from cancer. Everard Home has narrated a similar case.—Dr. Monro III^us.‡ records a singular case of *polypus* attached to the front of the œsophagus three inches lower than the level of the glottis. When the patient, a man aged sixty-eight, coughed or retched, the mass was thrown up into the mouth: eventually he died of inanition. The structure of this polypus is not described, but the mere facts of the pedunculated shape and moveableness of such a growth would suffice to show its non-cancerous nature. The tumor towards the close of life became fixed; the diagnosis would then turn on the previous history.—*Enlarged lymphatic glands* ad-

* C. Bell, Surg. Obs., vol. i. p. 82. 1816.—Robert, Nouv. Bibl. Méd., tom. iv. p. 415. 1827.

† Archives de Méd., tom. x. p. 79. 1826.

‡ Morbid Anatomy of the Gullet, &c. p. 186. 1811.

joining the œsophagus exercise pressure on the tube sufficient to produce many of the symptoms of cancer. But such enlargement is commonly scrofulous, occurs in young persons, is accompanied with a similar state of the more superficial glands, and may be modified by exhibition of iodine.—*Abscess* between the membranes of the œsophagus may produce long-continued dysphagia, and excite the suspicion of cancerous disease. Eventually the abscess bursts spontaneously or through accidental violence: Mr. George Bell,* introducing a probang in such a case, ruptured the abscess and cured his patient.—*Cancer of the mediastinum*, or even cancer limited to the *lung*, (this is however much more rare,) may by pressure on the tube give rise to permanent dysphagia, and even the formation of an œsophageal pouch. But the physical and other characters of the former affections, as described in the chapter devoted to them, will render error impossible.—*Aneurism of the aorta* is likewise distinguished by its physical signs. Nor is dysphagia by any means a common symptom; even where the aneurism bursts eventually into the œsophagus, frequently no obstruction to deglutition is experienced.—*Phthisical dysphagia*, depending upon laryngeal disease which affects the œsophagus spasmodically, is readily distinguished by the evidences of pulmonary tuberculisation. I would observe, that in this species of dysphagia it is sufficiently common for patients to experience much greater difficulty in swallowing liquids, of even the most emollient kinds, than solids.

The exact *seat* of the disease is to be ascertained by the feelings of the patient; sometimes by the discovery of an indurated mass or tumor in the neck in the course of the tube; better by the probang or wax bougie.

§ VII. That organic strictures of the œsophagus have been in some cases actually cured by persevering dilatation, effected with bougies or otherwise, and in others arrested in their progress, is a fact of which several instances might be adduced from English practice. These strictures were doubtless mainly dependant on simple thickening; but, as such thickening may merge into the more intractable malady, its successful treatment may prove, by possibility, prophylactic against the latter. Probably Dr. James Arnott's system of fluid pressure would be the most advisable in stricture of this tube. The compression exercised on the indurated tissues in cases of actual cancer would besides possibly have di-

* Mayo, Outlines of Pathology, p. 287. 1835.

rect beneficial effect, but mere palliation is all that can fairly be expected.

Whatever be the utility of cauterisation, as a means of destroying simple stricture, its only claims to notice in the treatment of obstruction of cancerous nature are as an alterative of the surface of the part. Employed in this way, nitrate of silver is unquestionably useful in relieving irritation and spasm, and consequently in lessening dysphagia.

The general treatment of cancerous affections should, as far as possible, be adopted. Leeching the throat will sometimes be found to relieve the sufferer's difficulty of swallowing in a remarkable manner.

The introduction of an œsophagus-tube may be necessary for passing food into the stomach: if the object be to leave it *in situ* for some time, it should be introduced through the nares; if it be used at each meal, through the mouth. The feelings of the patient are, besides, an excellent guide in making choice of either of these plans. When it becomes impossible to carry food into the stomach even by means of the tube, an attempt must be made to support the patient by nutritious enemata or baths.

Should the disease be seated at the upper extremity of the œsophagus, life might be prolonged by making an artificial opening below the obstruction, and conveying food by it to the stomach. The proposition (as appears from a statement by Morgagni,* who seems to think the difficulty of the operation the only objection to its employment) originated long since with Stoffel. The idea has been actually put in execution by Taranget; the female, operated on and fed in this novel manner, was kept alive sixteen months by its means. The description of the thickening and enlargement in this instance is imperfect; but the obstruction was complete.

SECTION X.

STOMACH.

§ I. The mortality caused by cancer of the stomach is very considerable; this organ yields to the uterus alone in the frequency with which its cancerous affections prove destructive of life. Of 8289 deaths from cancer in Paris, 2303 are referred to the stomach. In 67 post-mortem examinations of cancerous individuals, MM. Herrick and Popp found the stomach thus diseased 19 times.

* De Sed. et Caus. Morb., lib. iii. Ep. xxviii. Art. 15.

§ II. Cancer of the stomach is associated with carcinoma of other structures, or is the solitary evidence of the diathesis: the former is the more common case.

All possible combinations of organs are observed when the stomach is cancerous; but the contents of the abdomen are more usually affected than those of the thorax, cranium, or pelvis. As a singular combination of cancerous organs, of which I have myself had cognizance, I may mention that of the stomach, liver, duodenum, lymphatic glands, lungs, supra-renal capsules, and prostate gland. When the disease is of the colloid species, the omenta become almost invariably cancerous by continuity of structure. Organs which are, as a general fact, rarely implicated secondarily (p. 96), exhibit no unusual proneness to suffer when the primary disease affects the stomach; thus the uterus and stomach (organs so frequently cancerous as to have furnished 5299 of 8289 deaths from the disease) are scarcely ever found thus diseased in the same individual; the influence of sex has, however, something to do with this result.

When cancer of the stomach coexists with carcinoma of other localities, it is almost invariably primary. Secondary gastric cancer, unless that propagated by continuity from circumjacent structures, is almost unknown. Certain cases there are, where distant organs suffer as well as the stomach,—for example, the ovaries and uterus; but in such cases the systemic development appears to me of the simultaneous or independent species (see p. 110).

The liver stands at the head of all organs in respect of frequent secondary implication in cases of gastric cancer. I have never met with an example of affection of the lungs, while the liver escaped, and the primary disease occupied the stomach. This fact is explicable on the general principle formerly laid down (p. 113), and likewise by the close venous connexion existing between the organs; secondary hepatic cancers have appeared to me also to exist in greater abundance, when the primary affection had occupied the stomach, than any other locality.

§ III. The three species of carcinoma occur in all their varieties in this organ. This is the site specially affected by colloid cancer; and the milt-like variety of encephaloid is here more common than elsewhere.

§ IV. It is usual to find cancer apparently forming a tumor, variable in shape and size, on the internal surface of the stomach; but this arises from irregular and uneven infiltration. Pure tuberi-

form deposition, as far as I have seen, hardly ever occurs in this organ. Infiltration may take place so equably and uniformly over an extensive surface, that scarcely any appearance even of tumor is produced. Infiltration is essentially the mode of deposition prevailing in the stomach, and the same is true of the entire alimentary canal. I have in a single instance seen a distinctly tuberiform mass of encephaloid in the submucous tunic; and the marked thickening, which this tissue had undergone around the cancerous substance, almost gave the latter the appearance of being encysted.

§ V. The pylorus is the part of the stomach most commonly affected with cancer; next in order comes the cardiac orifice; then the greater, and lastly the lesser curvature. When in connexion with the orifices (which may have undergone reduction of, or increase in, diameter), the disease may spread to the duodenum or œsophagus. I have never known of an instance in which cancerous disease was limited to the fundus; but even this portion of the viscus is sometimes encroached upon by infiltration advancing from adjacent points. Three-fourths, or even more, of the organ may be disorganised by the extension of the disease; colloid is the species most common in instances of this widely-spreading destruction.

The sub-mucous cellular membrane is the special seat of cancerous formation in the stomach; and I believe always its primary place of development, excepting, of course, cases where the organ is merely contaminated by propagation. But, as I have already shown (p. 28), the mucous membrane, especially when in a state of hypertrophy, may become a nidus of formation. The intra-muscular cellular tissue, as likewise that separating the muscular and peritonæal tunics, also undergoes infiltration.

§ VI. As a general truth, the mucous membrane exhibits a notable power of resistance to the encroachment of the disease. Even the stratum lying immediately over cancerous substance is slow to undergo infiltration or to ulcerate: its prevailing tendency is to become hypertrophous; and, as is the case with mucous membranes generally, hypertrophy here also occurs irregularly, and hence gives rise to the apparent formation of vegetations, fungiform and cockscomb processes, &c. In a considerable number of cases (I fear to say the majority, though my own experience would justify the expression) the remaining tract of the mucous membrane exhibits no particular alteration, with the exception of active hypertrophy; evidences of inflammation, softening and attenuation, on the one hand, grey discoloration, hardening, and ulceration on the other,

are commonly wanting. They may and do sometimes exist, however.

The cellular structure of the organ (sub-mucous, intra-muscular, and sub-muscular) undergoes very marked thickening: at least, this appearance is produced by the abundant development of fibriform and cell-structure in the situation naturally occupied by that tissue. This kind of production between the fasciculi of muscular fibres gives rise to a striated appearance (the striæ, of bluish-white tint, commonly running at right angles to the mucous surface), which forms a peculiar feature of cancer of the alimentary canal generally. Clearly apparent almost from the outset of the disease, this striated aspect may eventually disappear from the encroachment of the adventitious substance and atrophy of the muscular fibres. Amid the new fibriform structure cell-development actively advances.

While these changes advance in the muscular structure of the part of the organ actually cancerous, the muscular coat generally becomes, in many instances, hypertrophous ; and has been known to attain an inch in thickness. It at the same time grows paler, less elastic and more friable than natural. Attenuation and almost complete atrophy of the muscular coat are, on the other hand, sometimes observed.

The peritonæal coat commonly escapes alteration when the disease is of scirrhous or encephaloid species ; it frequently participates in the alteration when colloid. Small thin scirrhous patches are sometimes found on its surface.

The vagus nerve has been found partially scirrhous by Bichat, Cruveilhier, and Prus.

It is very usual to find thick viscid mucus, stained of a brownish-red colour, in some abundance in the interior of the organ. Such substance may be present before, as well as after, ulceration has occurred: the discoloration in the former case arises from simple transudation of blood. This mucus, as well as certain spots and patches of the mucous surface, may be stained of an almost black hue,—the acidity of the gastric juice explains the fact.

§ VII. The size of the organ varies extremely; in some cases unaltered in this respect, in others the stomach is so much enlarged that the great curvature almost reaches the os pubis (University College Museum), while in a third class of cases it is contracted and singularly reduced in bulk and capacity. This variation of size is connected with variation in locality of the disease, and in the state of the orifices of the stomach: when the body of the organ is alone

affected, the general bulk commonly remains unchanged; if the disease implicate and cause narrowing of the pylorus, enlargement ensues; if the cardiac orifice undergo contraction, diminished volume is the result. The reasons of all this are sufficiently plain. But another well-ascertained fact, that, in cases where the pyloric orifice undergoes dilatation, the walls of the stomach become hypertrophous, is not so readily intelligible.

§ VIII. The general description of the mode of progress of the different species of cancer strictly applies to the disease in the stomach. In a previous place (p. 27) I have fully described the anatomy of the colloid species in this organ. Ulceration, as I have mentioned, is rather slow to occur; but, once set in, effects most extensive ravages both in superficies and depth. Several drawings in the University College collection illustrate the occurrence of sphacelus, more or less extensive, of the cancerous substance and implicated structures. Eventually the peritonæum is perforated, and fatal effusion occurs into the cavity of that membrane, or, as fortunately happens in a large proportion of cases, adhesions are established (previously to perforation) with some neighbouring part, and effusion prevented. The pancreas or liver forms the most common basis of perforating gastric cancer; but communication is not unfrequent with the interior of the transverse colon, and (University College Museum) both the liver and colon may be perforated in the same case. The disease may extend to the spleen, kidney, omentum, and mesentery. Bayle and Cayol have known the dorsal vertebræ partially destroyed through the advance of cancer of the stomach; and, in a case recorded by Chardel, the abdominal parietes were destroyed to a considerable extent by sphacelus, the tumor protruding through an opening produced in this way. I have before me a drawing by Dr. Carswell of a cancer of the pylorus, attended with formation of a separate growth of the same genus in the superjacent abdominal parietes: around the parietal tumor an abscess had formed.

The connected lymphatic glands exhibit the usual changes; the lymphatic vessels of the omenta and mesentery may be nodose, enlarged, loaded with cancerous matter, and even exhibit small cancerous nodules from place to place, as is shown by some of Dr. Carswell's drawings (No. 72, a.) in the University College Museum. The mesenteric glands are sometimes also infiltrated independently with encephaloid. The coronary veins occasionally contain cancerous matter (ib. F.A. 329).

§ IX. The general etiology of cancer applies with little modi-

fication to that of the disease in the stomach. Contrary to the general law, however, gastric cancer is more common in males than females; though certainly not to the extent which has been maintained by some writers: — of nineteen persons examined by Herrick and Popp, nine were males, ten females. Of extreme rarity before the thirtieth year (M. Andral has recorded a case in which the affection must have originated at about the age of twenty), cancer of the stomach begins to be frequent towards the thirty-fifth and fortieth years, and again becomes rare towards the sixtieth.

The stomach is among the organs in connexion with which the influence of hereditary and family taint has been most distinctly recognised. The family of Napoleon exemplifies the fact: himself, his father, and his sister Caroline, all fell victims to gastric cancer. And by this organ, too, are furnished the most frequent examples of generation of cancer under the apparent influence of mental suffering.

I have already (pp. 166, 167) shown, that proof of the accuracy of various notions, ascribing the production of the disease to mechanical and chemical irritants, is not supplied by their advocates. M. Barras* refers to two cases, where fatal cancer of the stomach was apparently caused by the habit of drinking vinegar to keep a tendency to obesity under control; and states that, according to M. Rienzi, a lay writer on the "History of Oceania," the inhabitants of the Haouai Islands use as their habitual drink an acid liquor called *Kava*, for the purpose of preventing corpulence,—the beverage produces the desired effect, but at the same time causes sufferings in the epigastrium, under which the Kava-drinkers perish in a state of marasmus. M. Barras likewise records briefly the histories of a butcher who fell a victim to cancer of the stomach, caused, as it is presumed, from the habit of taking spirituous liquors in the morning; and of a physician, whose similar fate was traced to the medicinal use of arsenic. M. Barras forgets that the indulgence in morning stimulants is not confined to the hapless butcher; and that hundreds of individuals are submitted to arsenical treatment for the relief of cutaneous and other maladies, without acquiring in consequence a carcinomatous tumor in their stomachs. Why, too, if mechanical and chemical irritants are so all-important in the generation of the malady, does the cancerous formation especially eschew those parts of the organ (the fundus and parietes) upon which such irritants must of necessity act? It is maintained in

* Sur le Cancer de l'Estomac, p. 17. 1842.

some quarters that chronic gastritis and gastrodynia frequently terminate in cancer. I see nothing impossible in the sequences; but they are certainly rare: and their apparent occurrence may in reality depend, sometimes at least, upon the excessive difficulty of distinguishing the symptoms of cancer at the very outset from those produced by the other two kinds of gastric affection.

§ X. The duration of cancer of the stomach is variable; and of the ordinary amount of this variation, sixteen cases, observed by MM. Herrick and Popp, furnish a fair idea:

No. of Cases.	Duration.	No. of Cases.	Duration.
4	3 months.	2	1 year.
4	6 „	2	2 years.
2	9 „	2	several years.

The duration of the disease is shortest when the morbid production occupies the cardiac orifice; longest, when it is seated in the body of the organ.

§ XI. I shall first concisely describe the ordinary course and mode of connexion of the symptoms of the disease, and then examine particularly some of the more important among them. Authors have commonly recognised three periods in the progress of the malady,—and although the arrangement is somewhat artificial, it is not without foundation in clinical observation. (*a.*) During the first of these periods various dyspeptic symptoms exist; the tongue is pale, the mouth clammy and disagreeable in the mornings, the appetite variable and impaired; digestion, laborious and slow, is sometimes, it is said, so curiously perverted, that food, which in the healthy state would inevitably cause indigestion, passes through the stomach without causing particular annoyance; a sensation of weight and fulness is felt at the epigastrium, or even actual pain, very rarely of any severity, sets in; this region is slightly tender under pressure; gaseous eructations, either fœtid and acrid, or free from smell, occur during digestion; vomiting is rare, but the ejection of a small quantity of glairy fluid from the stomach in the morning is among the more constant signs of the affection in this stage; flatulence and constipation torture the patient; the constitution may begin to sympathise, and the peculiar tint of skin exhibit itself to a slight degree.

(*b.*) By-and-by the severity of the epigastric pain increases, the appetite fails completely, fœtid eructations occur more frequently; constipation and flatulence become more constant and obstinate; vomiting occurs with frequency, and the matters vomited mav be discoloured in various ways; succussion of the epigas-

trium causes a gurgling noise; by careful manual examination and percussion a tumor may be discovered in connexion with the stomach; the general symptoms more and more distinctly assume the cancerous type, yet the pulse may remain tranquil.

(*c.*) Finally, the intensity of all these symptoms increases, obstinate constipation alternates with attacks of colliquative diarrhœa; the pain becomes unendurable; hiccup adds to the sufferings of the patient, and almost everything swallowed is productive of vomiting; all physical strength is annihilated; the pulse becomes feeble and almost filiform,—attacks of syncope are not uncommon; the skin dry and of marked cancerous tint; the face pinched, worn, and expressive of anguish and moroseness: eventually the patient perishes in a state of perfect marasmus.

Some of these symptoms require closer analysis. — Epigastric pain may continue absent from first to last, but exists in the great majority of cases. Rarely lancinating, it nevertheless distinctly possesses this character in some instances,—a fact of which I have recently met with a striking example at University College Hospital. Limited commonly to the epigastrium, it sometimes extends to the hypochondrium, to the abdomen generally, to the spine, or shoots in the direction of the œsophagus. At first occasional, and produced by ingestion of food, (some patients, however, feel relief from the presence of food in small quantities,) it subsequently becomes constant, though in some instances continuing intermittent and paroxysmal almost to the last. The severity is such in some cases that the sufferer rolls himself on the ground in a state of inexpressible anguish;* in a few instances it remains comparatively slight to the end.

Tenderness of the epigastrium under pressure may be very slight, or even completely absent,† even in cases where a tumor is distinctly to be felt through the abdominal parietes. The tumor itself may either give signs of high sensibility if pressed upon gently, or be almost insensible under rough manipulation of the integuments lying immediately over it.

The dyspeptic symptoms of cancer of the stomach are liable to

* Pain of this violence may be felt at a much earlier period even. "In the private memoirs of Napoleon, we read that he was subject to horrible pains in the epigastrium, which often obliged him to roll himself on the ground .... These pains signified the early stage of the cancer that, twenty-five years later, destroyed him."—Barras, loc. cit. p. 23.

† Louis, Hypertrophie de la Membrane Musculaire de l'Estomac, in Mémoires Anat. Pathologiques, p. 122. 1826.

very striking variation, and, as is more particularly to be noted, the amount of disturbance is by no means always directly as the extent of anatomical change. M. Andral* has seen individuals in whom extensive scirrhous formation or actual cancerous ulceration of large size had been attended during life with no more serious gastric disturbance than loss of appetite and slight discomfort at the pit of the stomach after eating.

Nausea and vomiting, the ordinary sources of most serious suffering, may be absent from first to last. Numerous satisfactory examples of the fact are upon record; as also of the disappearance of these symptoms at an advanced period of cases, in the early stage of which both had been of frequent occurrence. Unquestionably, the condition of the orifices influences their production. If vomiting do not occur, it may be inferred that the pylorus is free; and if there be intense nausea, and no vomiting properly so called, but simply occasional ejection of glairy matters by the mouth, or regurgitation of food shortly after ingestion (see p. 272), the cardiac orifice may be considered the seat of the disease. Again, if abundant vomiting occur periodically (at intervals of six or eight days, for instance), it is presumable that considerable dilatation of the stomach coexists with coarctation of its pyloric orifice. Where the pylorus is contracted and the stomach retains its natural size, or (as is sometimes the fact) undergoes diminution of capacity, vomiting takes place shortly after the ingestion of food. But implicit trust is not to be placed in rules based upon these considerations. It is an established fact, as M. Ferrus observes, that partial disorganisation of the body of the stomach is sometimes attended with obstinate vomiting, although the pylorus be perfectly healthy; total destruction of the walls of the organ may or may not be attended with the same symptom, both orifices continuing free. The same writer had cognizance of a case of cancerous ulceration of the body and cardiac orifice of the stomach, wherein vomiting was among the symptoms. And when, as in certain cases on record, a fungous production is connected with the cardia, vomiting, most distressing at one period, may be absent at another, —the change depending on the valve-like character of the production, whereby the orifice, at one time closed, is at another scarcely or not at all obstructed.

Ulceration and obvious coarctation of the pylorus have been met with in the bodies of persons who had not vomited during

* Clinique Médicale, tom. iv. p. 105, 2ème édit. 1831.

life. It is to be remembered, however, that ulceration might become so deep and extensive in the pylorus, or that such separation of cancerous fragments might take place, as to re-open a free passage, where more or less complete obstruction had at one time existed.

The nature of the matters vomited varies. At first composed of glairy and watery fluid, they subsequently contain imperfectly digested food, and occur more or less closely after its ingestion. Some kinds of food are more constantly rejected than others; and food just swallowed has been known to remain in the stomach, while the yesterday's meal (still cognizable by its physical characters) was expelled. At a later period they become coloured brownish, or blackish, evidently from admixture of blood, altered in characters by the gastric juice,—seeming thus to hold in suspension matter like coffee-grounds, or particles of soot. The quantity discharged at one time varies between a spoonful and several pints; the latter enormous discharges are almost peculiar to cases of the periodical vomiting attending dilatation of the stomach with constricted pylorus.

The appearance of the alvine dejections varies extremely. They sometimes contain coffee-ground looking matters; and, as I have once seen, while evacuation of this kind goes on from the bowels, it may cease from the stomach.

M. Louis (loc. cit. p. 130) has drawn particular attention to the form of the abdomen. In the two cases related by him, the abdomen, fuller and more tense on the left than the right side, exhibited in the former direction a slight prominence representing accurately the form of the stomach; the lower edge of this prominence lay a little below the umbilicus. But this appearance is unquestionably not one of habitual occurrence; and it is obvious that the amount of distension of the organ, and the precise site of the morbid formation, must greatly modify its characters and influence its existence.

Cancer of the stomach does not give rise to ascites; but, should the omentum become implicated in the disease (as is most common in cases of colloid), that symptom is commonly induced: general dropsy sometimes eventually follows.

The diagnostic importance of tumor is in these cases extreme. If it exist and have attained any bulk, it may readily be discovered by percussion and manual examination (sometimes it is even visible) when seated at the pylorus or great curvature; it is with much more difficulty to be detected when occupying the lesser curva-

ture, and cannot be satisfactorily made out when connected with the cardia. The situation in which the tumor is felt changes not only with the daily alternations in the condition of the stomach, but with the progress of the disease,—the source of the latter kind of change is doubtless to be found in the increasing distension of the organ: where this distension is carried to extremes, a tumor, connected with the pylorus, may be seated in the right iliac fossa. The ordinary position of a pyloric tumor, however, is a little to the right of the middle line, and from one to three inches below the ribs.

Despondency and moroseness of temper are peculiarly remarkable in cases of cancer of the stomach; and reach their acme when the disease occupies the cardiac orifice. A patient of M. Cruveilhier affected with cancer in the latter site committed suicide in a paroxysm of despair. The doctrine of Broussais ascribed hypochondria to chronic inflammation and cancer of the stomach; Bayle and Cayol, Barras and others, maintain that neither of these gastric affections give rise to that peculiar form of intellectual disturbance.

§ XII. It follows clearly from what has been said, that the nature of the symptoms and the course of gastric cancer vary with the part of the organ affected. The distinction maintains itself even to the close of life. Thus, when the cardia is obstructed, death occurs by inanition, precisely as in cases of œsophageal cancer; the advance of the cachexia cuts off individuals in whom the orifices are free; or, it is not uncommon, as has been remarked by M. Ferrus, when a state of contraction of the pylorus has been removed by ulcerative destruction, for life to be abruptly terminated by wasting and incontrollable diarrhœa.

§ XIII. The course of gastric cancer, instead of being uniformly progressive, may be intermittent. Although, in some instances, cessation of suffering and functional disturbance may perhaps be ascribed to the influence of some happy system of treatment, yet it is in the great majority of cases the result of a spontaneous process, the nature of which is unknown. It is conceivable, that in certain instances the detachment and conveyance from the stomach of fungous vegetations blocking up the pyloric orifice, may, by liberating that orifice, cause the removal of all symptoms depending upon its obstruction; but this explanation will by no means hold invariably good. Be this as it may, the physician should never lose sight of the fact, that in many recorded cases of gastric cancer, the

* Cruveilhier, Anat. Pathol. Livraison iv.

suspension of symptoms (especially in the early periods of the malady) has for a time been so complete, that the disease was suspected to have been at first misunderstood, and to have been really nothing more than nervous or irritative dyspepsia.

The course of the disease is necessarily modified, if perforation of the stomach with establishment of a communication with the peritonæal cavity or intestine occur.

The malady occasionally runs a latent course. An aged female, with all the appearances of perfect health, fractured the cervix femoris; she died from the injury: on the posterior wall of her stomach, and tolerably close to the pylorus, M. Bouillaud found four cancerous vegetations. Cruveilhier relates a case similarly deficient in symptoms, where the disease occupied the lesser curvature and anterior and posterior walls adjoining. The fact of the morbid product in such cases not being placed so as to cause mechanical obstruction, accounts for the absence of local symptoms; but it is not thus easy to explain a state of local latency where the pylorus and its neighbourhood are implicated, and where scarcely a third part of the gastric surface retains its healthy characters. Colloid is most commonly the species of cancer in cases of the latter class; yet that it is not always so, the following brief history proves. A man was admitted into hospital on the 13th Feb., having been ill eight or ten days from the effects of a fall; he had had no illness of any kind previously. He grew emaciated, suffered from gastric symptoms, and died on the 2nd April. The *entire* stomach (resembling a fowl's gizzard in appearance) and part of the œsophagus were scirrhous.*

§ XIV. A number of very different affections have occasionally been mistaken for cancer of the stomach, and *vice versâ*. The most practically important of these affections are *gastrodynia* and *chronic gastritis*. The chief points of distinction may be enumerated as follows:

GASTRODYNIA.	CHRONIC GASTRITIS.	GASTRIC CANCER. (Early period.)
Tongue variable; but often pale and pitted at the edges.	Tongue dry, red, contracted, smooth, shining; or saburral.	Tongue pale or natural.
Eructation frequent, of air without disagreeable smell.	Eructation not a prominent symptom.	Eructation of air more or less fœtid, sometimes horribly so, a prominent symptom.

* University College Museum; observed by Dr. Carswell.

GASTRODYNIA.	CHRONIC GASTRITIS.	GASTRIC CANCER. (Early period.)
Appetite depraved, irregular, capricious.		Appetite diminished, or even totally suppressed.
Sensations sometimes of heat, sometimes of cold in stomach; thirst not common.	Sensation of heat in stomach; thirst.	These symptoms not observed.
Solids more easily digested than liquids.		Liquids more easily digested than solids.
Though the labour and suffering of the process be great, digestion is completed in the end.	Digestion imperfectly completed.	Digestion not properly effected.
Pain variable; occurs in irregular paroxysms; is often relieved by ingestion of food or pressure.	Epigastric pain not very severe and scarcely ever felt, when the stomach empty; is increased by pressure.	Epigastric pain may be agonizing; the lancinating character sometimes marked; often increased by pressure.
Epigastric pulsation not uncommon.	Is not observed.	Is not observed.
Never runs a completely latent course.	Never completely latent.	May for a variable time be completely without local symptoms.
[See diagnosis of "Chronic vomiting; p. 292."]	Vomiting of sudden and severe character sometimes the very first symptom; occurs irregularly before or after eating.	Vomiting of sudden and severe character is never the first symptom; it occurs generally early in the morning, subsequently at variable periods after eating, or at periodical intervals.
Vomiting of coffee-ground-looking matter does not occur, unless from accidental and rare hæmatemesis.	Coffee-ground-looking matter sometimes vomited; but this is rare and exceptional.	The matters vomited are at first glairy, then half-digested food, then coffee-ground or soot-like.
Bowels generally constipated, but not obstinately so.	Irritation, colic, and diarrhœa frequent from extension of inflammation to intestine.	Bowels habitually and obstinately constipated; occasional severe diarrhœa.
Febrile action accidental and rare.	Evening fever not uncommon.	Fever absent.
In females the chlorotic tint is often present.	Violent discoloration of the lips, conjunctivæ, and face, &c. often present.	Straw-coloured tinge of skin may be obvious.

GASTRODYNIA.	CHRONIC GASTRITIS.	GASTRIC CANCER. (Early period.)
Often accompanied with various nervous or hysterical symptoms.	Not so attended.	Not so attended.
Hypochondria occasionally present.	Hypochondria is not caused by chronic gastritis (p. 288).	Hypochondria is not among the effects of gastric cancer. [?]
Is more frequent than the other two affections.	Is rarer even than cancer.	Is much more rare than gastrodynia.
Is more common in women than men.	Is of equal frequency in both sexes probably.	Occurs more frequently in men than women.
May exist in very young persons (e. g. æt. 15).	Occurs at all ages.	Is excessively rare before ætat. 30.
Is often hereditary.	Is not hereditary.	Occasionally runs in families.
Is rarely referrible to any distinct local exciting cause.	Is often referrible to some distinct local exciting cause.	Is rarely, if ever (p. 283), referrible to local agencies.
Is relieved or cured by stimulant, tonic, and anodyne treatment.	Is relieved or cured by antiphlogistic treatment.	Is not cured, but is relieved, by special treatment.

But although this array of distinctive characters looks most satisfactory on paper, it must be confessed, that, even after due consideration of them all at the bed-side, doubt will sometimes still remain in the observer's mind. As cancerous disease advances, as the epigastric region becomes the seat of tension and of gurgling noise under pressure, as the patient vomits periodically profuse quantities of the coffee-ground matters, the diagnosis becomes more and more certain. In the great majority of instances, such a combination of symptoms and signs would warrant a decisive assertion of the presence of cancer; but exceptional cases do certainly occur, (and I have both seen and known of such myself,) proving that this very combination may arise, though no cancer exist; cases showing that the diagnosis is not absolutely certain, unless in addition *tumor* be discoverable. The simple chronic ulcer of the stomach, follicular ulceration (University College Museum, No. 2130), and simple exhalation of blood from the gastric surface* may all of them give rise to the vomiting of matters similar to those ejected in cases of cancer. A woman (whose history is preserved in the collection of University College) had cancer of the uterus, and vomited bloody matters occasionally. Did the fact of cancer existing in the uterus

* Such was the origin of continued bloody vomiting in the case of a right reverend prelate not many years deceased.

increase or diminish the chances that the hæmatemesis was produced by similar disease in the stomach? If in one obvious point of view it apparently increased those chances, it diminished them on the score of the excessive rarity with which the uterus and stomach become cancerous in the same individual. Be this as it may, the sole morbid change in the stomach was follicular ulceration. As a general fact, hæmatemesis is less valuable as a diagnostic sign of cancer in females than in males.—Blood may gravitate into the stomach from the nares* or mouth, and subsequently produce a sort of pseudo-hæmatemesis.

Simple chronic vomiting (with or without gastrodynia) is especially frequent in females, and is almost confined to persons affected with hysteria. The absence of other symptoms of cancerous disease, the continuance of the vomiting unattended with obvious impairment of the general health, will besides aid in distinguishing the cases.

Hernia of the stomach between the recti muscles may, as is proved by the case of a young surgeon on record,† cause abundant and obstinate vomiting, severe epigastric pain, slow fever, and extreme emaciation. The tumor produced by such a hernia is soft, elastic, and reducible by pressure; and the entire train of symptoms removable by the application of a truss.

The modes of distinguishing cancerous disease in various adjacent parts from cancer of the stomach must be gathered from the descriptions elsewhere given of the malady in those parts.

§ XV. In respect of the curative treatment of cancer of the stomach, there is little to be said. Removal of the disease is stated, in some instances on record, to have followed the sustained use of conium; and diminution of the bulk of tumors in this situation, as well as material improvement in the general and local symptoms, are vouched for by most conscientious writers as having been produced through the influence of this medicine and appropriate diet. I have already (p. 195) stated the more limited amount of advantage I have myself obtained from its administration; but I must add, that I had no means of regulating the regimen of my patients. Conium is the only medicine, among those put forward with anything of a specific character, which is applicable in cases of gastric cancer.

M. Recamier‡ draws attention to a case of pyloric tumor,

* Graves, Dublin Medical Journal, vol. i. p. 297.

† Mém. de l'Acad. Roy. de Chirurgie, tom. i. p. 702.

‡ Recherches sur le Traitement du Cancer, tom. i. p. 389.

"possibly cancerous," which was reduced in size by pressure on a very simple plan ;—the application of a folded napkin to the part, kept *in situ* with a bandage carried round the body. The symptoms, both local and general, were such as are witnessed in cancer of the pylorus, and a tumor existed there. Vomiting and nausea ceased, and the patient recovered flesh. The case is unquestionably deserving of consideration ; though not precisely proving all, the narrative is designed that it should.

Palliation is more frequently to be effected by applying the treatment of nervous than of inflammatory affections : a fact in accordance with the investigations of morbid anatomy, in so far as those investigations show that inflammatory action is a rare and merely accidental condition. A combination of trisnitrate of bismuth, and extracts of hop, stramonium, and conium in pill, I have used even in advanced cases with temporary benefit ; and in the early stages with more favourable results than any other medicine. But it is clear, that, in the course of so protracted a disease as the present, the medicines must frequently be altered : their nature should, I fully believe, be of the same kind as in the pill just recommended, —at least so far as a general rule can be established.

The application of leeches and blisters to the epigastrium should be had recourse to, if much tenderness under pressure and other symptoms of local irritation exist. Counter-irritation, recommended by some persons, has not appeared to me beneficial. A belladonna or opium plaster to the epigastrium affords much comfort to many patients ; and I have in a previous place (p. 222) suggested friction with liniments containing the more powerful narcotic alkaloids. The internal use of opium or its preparations is contraindicated by the habitual constipation : the cannabis Indica, though inferior as a narcotic, might for this reason be employed in doses of half a grain of the extract twice or more daily.

The three symptoms which torture patients most, for which they most earnestly implore relief, and for which unfortunately the physician is but too often unable to suggest an efficient mode of relief, are flatus, vomiting, and constipation. The ordinary carminatives are unquestionably, if long persisted in, productive of irritation ; oil of cajuput (a drop or two on sugar) is, I have found, the least detrimental of the class. Cold applications or blisters to the epigastrium occasionally give relief of some duration ; and a dose of morphia is sometimes serviceable. But management of the diet is essential ; excessive flatulent distension may in the majority of cases be directly traced to some errors in this respect :

on the relief of constipation too, that of flatus will follow. Nausea and vomiting may be relieved by effervescent draughts, prussic acid, blisters to the epigastrium, rough ice allowed to melt in the mouth, or the application of ice in bladders to the epigastrium. Where all these remedies had failed, I have known creasote (in the form of pill) arrest the symptoms for a time,—a sufficient proof of the difficulty of explaining therapeutical actions. Emollient and laxative enemata are the best means of keeping up due action from the bowels; laxatives by the mouth are admissible, but drastic purgatives under all circumstances to be avoided.

The management of the diet is of the very first importance; excess at table accelerates in many instances the course of the disease and adds to the severity of its symptoms. But I am persuaded the only *general* rules which can be correctly laid down for the guidance of the patient is, that the *quantity* of food taken at each meal be *small*, that each morsel be thoroughly masticated, and that the hours of eating be accurately the same day after day. As respects the *quality* of food most appropriate, no rule, applicable even to the generality of cases, can be established. Observation has fully convinced me that a milk diet, admirably fitted for one case, is seriously detrimental in another; that animal food, comfortably digested by one person, produces all the tortures of dyspepsia in another: and so on of all varieties of aliment. The truth is, the cancerous stomach, like the healthy organ, has its *idiosyncrasy;* and that idiosyncrasy is in each individual case only to be discovered by experience.

SECTION XI.

INTESTINES.

The intestinal canal is among the more frequent seats of cancer; 378 of 8289 deaths from the disease were due to its existence in this division of the digestive organs. The large intestine is more frequently affected than the small; the rectum alone supplied 221 of the deaths referred to.

SMALL INTESTINES.

§ I. The three species of cancer form in connexion with the small intestine; this is among the situations in which colloid carcinoma is of most frequent occurrence.

§ II. Cancer of the small intestine is almost invariably primary; but it is sometimes the result of propagation from an adjacent structure: when it coexists with carcinoma of distant parts, the

contamination of the bowel may be considered to have occurred independently.

§ III. The duodenum and upper part of the jejunum are by far the most common seats of the disease; so rare is cancer of the ileum, that its ever occurring in this portion of the bowel (unless through the contamination of adjacent disease) has been made matter of question.

§ IV. The mode of deposition and anatomical progress of the disease are precisely the same in the parietes of the small intestine, as in those of the stomach. Distension and hypertrophy of the bowel occurs above the seat of the disease; contraction and atrophy below it. These changes are proportional to the amount of coarctation existing in the seat of disease; and this coarctation may become so great, that a quill shall with difficulty be passed through the fissure. The intestines may be otherwise perfectly healthy (University College Museum, MSS. No. 31).

§ V. The symptoms of cancer of the small intestine generally are abdominal pain, at first occasional, eventually constant; accumulation of flatus; borborygmi; irregular fulness of the abdomen, disappearing as suddenly as it has formed, in some cases exhibiting the outline of coils of intestine; vomiting occurs occasionally, either of bilious or simply mucous and glairy character, or, if internal strangulation occur, of fæciform matter; meanwhile, the appetite is often retained, and the state of the pulse gives no evidence that serious disease exists. The patient loses flesh, however; œdema of the ankles sets in; the strength fails; the skin acquires the cancerous tinge. Some patients vomit at fixed periods after eating; this is especially the case where the cancer occupies a high part of the bowel. Tumor becomes sooner or later discoverable. Constipation grows obstinate, and sometimes alternates with violent diarrhœa: hæmorrhage from the bowel is of less frequent occurrence than might be anticipated. It should be borne in mind, although the peculiarity must be of very rare occurrence, that the fæces may, when discharged, be of flattened and ribbon-like shape,—as is usual in cases of contraction of the rectum (see p. 300).

Death is either the result of imperfect nourishment, and occurs after full development of the cachexia; or may be produced by sudden peritonitis following perforation of the bowel; or, as is not very uncommon, may be the result of ileus. The mode in which ileus is caused in these cases is thus plausibly explained by Rokitansky:* "The cancerous portion of the intestine is, quite inde-

* See Brit. and For. Med. Rev., vol. xv. p. 98.

pendent of the degree of stricture, in a completely passive state, in consequence of the firm, morbid matter, deposited in the submucous cellular tissue, and, still more, through the degeneration of its muscular coat. The onward motion of the intestinal contents through it is therefore effected by the muscular energy of the part of the canal above it; and this energy will be the more intense the more considerable the stricture, the greater the extent (in length) of the degeneration (although there be no stricture), and the greater the mass to be moved on. In all cases the intestinal contents will frequently stagnate in the canal above the diseased portion, and there they will accumulate, and distend it. Now this distension produces either (when it rapidly passes beyond a certain proportion) immediate paralysis of the tube, or it produces reaction, by which as much as possible of the contents is repeatedly forced through the diseased part; hence follows hypertrophy, especially of the muscular coat, and after this, when the accumulation and distension increasing gain the ascendancy, gradual exhaustion and paralysis. And this paralysed portion of the intestinal tube has in it the proximate cause of the ileus which soon ensues. As soon as the accumulation of the intestinal contents, continually passing into it, has become so great as to reach to that part of the canal above it which is still capable of contraction, this endeavours to force them on. But its most energetic action has little effect, since it has to overcome, not only the masses accumulated in the paralysed portion of the canal, but also, beyond them, a stricture. Under these circumstances the peristaltic motion becomes antiperistaltic, the intestinal contents are carried back to the stomach, and thence are discharged by vomiting."

§ VI. Although the course of cancer of the small intestine is, generally speaking, more or less steadily progressive, cases occur in which periods of more or less perfect intermission are observed. The only plausible explanation of the peculiarity is that separation of prominent vegetations from the cancerous surface occasionally takes place, and removes the cause of obstruction.

§ VII. The symptoms are influenced to a certain extent by the exact position of the morbid mass in the small intestine. Thus, in the collection of University College is a drawing of cancerous growths in the duodenum, which pressed on the ductus communis, and gave rise to jaundice. The morbid infiltration is said by Dr. Carswell to have been limited in many places to the mucous membrane. M. Cruveilhier records an interesting case of vascularized encephaloid growth in the duodenum close to the pylorus;

the tumor was moveable, and the author conceives it may have occasionally blocked up the pyloric orifice completely, and been held in that position by contraction of the pylorus. In this case long intervals of ease and freedom from symptoms occurred from time to time.

§ VIII. The situation of the tumor, as discoverable during life, necessarily varies. In a remarkable case, of which a drawing is preserved in the collection of University College, the swelling appeared to occupy the situation of the sigmoid flexure, and was after death found to fill two-thirds of the pelvic cavity on the left side; yet the tumor was seated solely in the walls (especially their convexity) of the upper part of the jejunum.

§ IX. The diagnosis of cancer of the intestine turns upon the discovery of an abdominal tumor, in a case where symptoms of chronic intestinal disease become complicated with evidences of increasing obstruction, passing eventually into a state of strangulation.

§ X. The treatment of cancer of the small intestine is the same in principle as that of the stomach.

LARGE INTESTINES.

§ I. The cæcum and sigmoid flexure of the colon are the occasional seats of cancerous disease; the transverse and ascending colon are with excessive rarity thus affected, while upon the frequency of the morbid formation in the rectum I shall presently have occasion to dwell.

§ II. The anatomical characters and course of cancer in the cæcum are sufficiently similar to those occurring in connexion with the small intestine, to make it unnecessary for me to enter into any additional details, beyond those given in the preceding pages. Nor have I any particular observation to make upon carcinoma of the sigmoid flexure; except that, as this portion of the bowel approaches very closely to the lower orifice of the alimentary canal, persons have been found bold enough to undertake surgical operations for the removal of the diseased part. At least, M. Reybard* excised a tumor in the sigmoid flexure along with three inches of the intestine,—and death was not the immediate result. The tumor grew again in the course of six months; but the patient survived the operation for a year.

* Bulletin de l'Acad. de Médecine, tom. ix. p. 1031. 1843-44.

RECTUM.

§ I. The importance of cancer of the rectum, as a subject of clinical study, is sufficiently shown by its frequency. This part of the intestine holds a very high rank among all the organs of the body in respect of proneness to cancerous disease; and rectal cancer furnishes 221 of 8289 deaths recorded in the Paris Registers,—a proportion assigning it the fifth place among fatal cancerous diseases.

§ II. Cancerous disease of the rectum may either exist as a primary affection, or be propagated from the uterus, vagina, or vicinity of the anus. Frequently consecutive in females to utero-vaginal cancer, it is even more commonly a primary complaint, and is, comparatively speaking, rarely attended with secondary development of cancer in distant organs. Usually of the scirrhous or colloid species, the morbid matter may be either infiltrated in the walls of the rectum, or present itself as a distinct tumor. In the former case a part only, or the entire, of the circumference of the bowel may be affected: in the latter the tumor occupies a particular spot of the cylinder, and, in the greater number of instances, its posterior aspect. The progress of the affection is the same as in other hollow viscera: fungating masses spring into the cavity of the intestine after ulceration, and may be either firm, or soft and pulpy. The diseased structure usually terminates abruptly both at the inferior and superior borders; superiorly the bowel may be uniformly dilated, or form a lateral pouch with hypertrophy of the muscular tunic—in some cases there are, besides, simple ulcerations of the mucous membrane. According to the remark of Bayle, small cancerous excrescences form on the skin round the anus, just as in the neighbourhood of mammary carcinoma.

§ III. When cancer is primary in the rectum, its most common seat is decidedly from two to three inches above the anus, the intervening space being perfectly free from morbid deposit; nevertheless Cruveilhier is perfectly justified in affirming that it does commence in all parts of the rectum. The tendency of the disease is to spread upwards rather than downwards. Bégin has known it extend to the transverse colon, transforming all the descending portion of that intestine into a scirrhous duct, of three or four inches' thickness in some parts of its walls, while the inferior three inches of the rectum had not suffered the slightest diseased change. Mr. Mayo has generally found the disease occupy from four to five

inches of the bowel, but has seen it involve as many as sixteen. The degree of constriction varies: in Baillie's plates,* a specimen is figured through which a goose-quill could with difficulty be passed; but the obstruction may be more complete even than this.

§ IV. The symptoms differ in the early stage, according to the form under which the affection occurs: the tuberiform variety is commonly, from the first, attended with pain in the sacral region, the nates, thighs, and hips; in the stratiform this is slower in appearing. The greater amount of pressure on the adjacent nerves in the former than the latter case, readily explains this difference. In both varieties a sensation of uneasiness in the rectum, a feeling as if its contents were never thoroughly evacuated, and a consequent repetition of the act of defecation, twice or more in the same day, sometimes accompanied with tenesmus, are among the first effects of the disease. These inconveniences may have possibly existed for a considerable time, before the morbid deposition has proceeded to any extent;—the nature of the disease is at this time rarely suspected. Difficulty in defecation progressively increases; a discharge of pus, or muco-pus, frequently accompanies that of the fæces, which are more or less tinged with blood; the latter may be effused in large quantities, but this is not common. Obstinate constipation, alternating with profuse diarrhœa, the former lasting for days, while the accumulation of flatus and fæces swells the abdomen to an enormous size, now becomes a formidable symptom. The copious evacuation, eventually brought about either by purgatives or by the natural irritation of acrid secretions, leaves the patient in a state of extreme collapse, and a prolonged fainting-fit is not uncommon under the circumstances. Before this relief occurs, the symptoms may have become those of internal strangulation,—nausea, vomiting of fæciform matter, hiccup, coldness of the extremities, vertigo, and even delirium. Irritation is meanwhile set up in the neighbouring parts; and difficult micturition, or, in some cases, on the contrary, incontinence of urine, follows. Irritability of the bladder may, indeed, (but this is rare,) be the earliest annoyance experienced by the patient. Abscesses sometimes form around the intestine, and burst into the vagina, in females,—an occurrence which sometimes produces much relief from the facility it affords for the passage of the fæces: in males such abscesses open into the bladder or urethra, in which case the patient voids both flatus and fæculent matter by that route. In

* Fasc. iv. Pl. iv. Fig. 2.

advanced cases there is œdema of the genitals and lower extremities. Unless relieved by the formation of an artificial opening in the bowel, the symptoms increase in violence—the retention of the intestinal contents becomes complete—not even flatus escapes—extreme tympanitis ensues, with the symptoms of strangulation: or rupture of the bowel from fæcal and flatulent distension occurs, followed by fatal effusion into the peritonæum.

Under particular circumstances there may be variation in these symptoms. When the disease is of the tuberiform character, perfectly circumscribed, and limited to a small part of the bowel, defecation may be, as in some cases related by authors, easily accomplished to the last, provided there be no considerable protrusion into the cavity of the intestine. Or the patient may suddenly find himself relieved, in a great measure, of his constipation, in consequence of the separation of prominent fungi, or deep ulceration of a protruding mass. Some persons suffer from constant diarrhœa, and, saved thus from the effects of retention, eventually perish with the cancerous cachexia.

The form of the fæces discharged gives good evidence of stricture; instead of being cylindrical, they are flattened and ribbon-like. This sign is of course wanting in cases attended with habitual diarrhœa. The incapacity of the rectum to receive an enema of the ordinary measure is a useful sign, when, more especially, the disease is seated beyond the reach of the finger. These circumstances, however, throw no light on the *nature* of the obstruction; nor does the former always distinguish its *seat*, for Hevin* has observed the same appearance in a case of coarctation of the jejunum. An irregular fæcal tumor forms in the left iliac region.—Examination with the finger, bougies, and the speculum ani, further establishes the condition of the part. The former of these modes of examination requires considerable tact, in order to be made as useful as it is capable of becoming; and, as Amussat† judiciously observes, the practitioner should familiarize himself, by exercise on the dead subject, with the differences in the relations of the part observable in persons of different age, sex, &c. He also states, that, by introducing the finger from behind, the surgeon is enabled to push it much further into the intestine, than if it be inserted from before or laterally. The situation of the obstruction, its degree, the state of the walls of the bowel, and the presence of a tumor, or of a

* Mém. sur la Passion Iliaque, quoted by Costallat in Essai sur un Nouveau Mode de Dilatation, &c. Paris, 1834.

† Gaz. Méd. de Paris, Dec. 1838; Jan. 1839; Oct. 1839.

stratiform mass, of ulceration, or of fungous formations, are thus ascertained. When the disease is originally seated too high up to be touched by the finger, it may, at a later period, be brought within reach of this, from being gradually forced downwards by the accumulation of fæces above it. Cruveilhier was, from this cause, enabled to reach a stricture which, on inspection after death, proved to be seated five or six inches from the anus. The characters of the disease may be sometimes ascertained with greater accuracy by the soft wax bougie: when the disease is seated high up, the use of this instrument is still more valuable, but also attended with difficulty, as in cases of extreme constriction it is no easy matter to find the central canal. This becomes of importance in respect of the treatment, and M. Amussat has endeavoured to overcome the difficulty by some contrivances of no small ingenuity. Respecting the mode of introducing the instrument, it is only necessary to state here, that, if gentleness be requisite under all conditions of disease, it is essentially so in cases of cancer. The speculum ani may be advantageously employed when doubt exists as to the presence or degree of ulceration, &c., provided the affection occupy the lower part of the bowel.

§ V. It is to be regretted that in his recent calculation of the relative frequency of organic stricture of the rectum in the two sexes, M. A. Bérard* has not specified the nature of the morbid contraction in the forty-three instances, of which twenty-three occurred among women, and twenty among men. Judging from the general laws of the disease, it is probable that cancer carcinoma of the rectum is most frequent in the female sex; and such is the result of Mr. Copeland's and Mr. Mayo's experience. Desault's commonly quoted estimate is unworthy of confidence, as well from the small number of cases on which it is founded, as the uncertainty of the nature of those cases. Cancer of the rectum is commonly a disease of adult and advanced age; yet it may occur in extreme youth. Mr. Mayo has observed ulcerated scirrhus in a child aged twelve years. Dionis† speaks as if "fungus of the rectum" were an acknowledged effect of pæderasty; the error of this notion is now ascertained.

§ VI. Various conditions of the rectum, dependent on chronic inflammation, are liable to be confounded with cancerous stricture. Thus, *hypertrophy* with *induration* of the submucous and other tissues of the bowel (simple stricture) produces almost all the local

* Gaz. Méd. de Paris. Mars 1839. † Cours d'Opérations, p. 320.

symptoms of the disease under consideration;—this affection is however generally seated higher up in the canal towards the sacro-iliac synchondrosis, is less painful, and more readily influenced by treatment.—*Simple chronic ulcer* of the rectum, as of the mucous passages generally, when in the course of cicatrization, is accompanied with formation of induration-matter and contraction of the tissues engaged in the process: a case of this kind, related by Cruveilhier, was attended not only by the local but the general symptoms of a cancerous affection: the distinction under these circumstances would appear to be scarcely possible during life. However, the similarity to cancerous disease is not always so perfect as in this instance, and the affection may commonly be recognised by physical examination. This appears to have been the fact in a case described by Dr. Hodgkin.* It is a remarkable circumstance that the cure of such ulcers entails more dangerous consequences than the original disease. Dr. Carswell† has similarly shown, that, in continued fever of the French type, death may occur long after the establishment of imperfect convalescence, from the contraction of the cicatrices of ulcers seated in the glands of Peyer. M. Louis‡ shows, (the subject had already been investigated by M. Corbin,) that, among the multifarious ways in which phthisis destroys its victims, stricture of the ileum, from cicatrisation and contraction of ulcers in those same glands, holds a certain rank.—Chronic inflammation, with *perforations of and partial sinuses in the bowel*, is distinguished by examination with the finger.—*Spasmodic stricture* is an affection more written of than observed; of course I exclude from this observation spasmodic contraction of the sphincters, with or without fissure, a condition as painful in its effects as easily distinguished by examination.—*Paralysis* of the gut is recognised by the masses of fæces of natural appearance, which are sometimes discharged after accumulation in the dilated bowel, and by the absence of constriction as discovered by the finger and bougie.—*Enlargement of neighbouring parts*, as of the prostate or uterus, *displacements* of the latter organ, *tumors* of the mesentery or ovary, *urinary calculi*,§ a *pessary*,‖ may produce extreme difficulty in defecation: careful examination of all the parts concerned is requisite to assure ourselves of the nature of the obstruction.

* Bright's Reports, vol. i. p. 117.

† Illustrations of Elementary Forms of Disease.

‡ Traité de la Phthisie, 2e édit. obs. lx. p. 555. Paris, 1843.

§ Tulpius, Obs. Med. lib. iii. cap. 2.

‖ Marquet, Traité de l'Hydropisie, &c. p. 160. 1770.

§ VII. In the medical treatment of the disease, the most important object must be to facilitate, as far as possible, and by the most gentle and unirritating means, regular action of the bowels. Simple enemata of warm water, with mild laxatives, will commonly suffice for the purpose for some time; at a more advanced period, medicines of greater activity may be absolutely required. Mr. Mayo advises a few drops of laudanum to be taken after each evacuation. But, however necessary it may ultimately become, there is a strong objection to the use of opium, whether in the form of suppository or otherwise, in its tendency to increase constipation and retard the periodical evacuation by which some patients are relieved: large doses of hyoscyamus are preferable, so long as they produce a sufficient anodyne effect. Leeches to the sacrum or perinæum mitigate pain and lessen spasm. Sir B. Brodie advises the use of linseed oil in injections, either pure or combined with lime-water, for relieving irritation, and alkalis with balsam of copaiba internally.

Upon the advisability of attempting to dilate carcinomatous stricture of the rectum with bougies or other contrivances, opinion is divided. Although we find Bégin affirming that he has been very successful in the treatment of this affection (when so situated as to be beyond the reach of the knife), by the application of leeches through the speculum to the diseased part, and by compression, it is just to add, that the majority of practitioners, especially of our own country, regard the plan not only as useless, but injurious. And it argues ill for M. Bégin's performances, that, in the case he has chosen to illustrate them, the affection was probably not carcinomatous, and, under all circumstances, only temporarily benefited. There can be little question, however, of the propriety of using the bougie as a palliative, when the obstruction begins materially to affect the excretion of the fæces;—necessity then points to its use. In more fortunate cases occasional employment of the bougie is sufficient, producing a degree of relief which carries the patient successfully through for some days, or even weeks: in other instances it becomes necessary to introduce the instrument before each evacuation. This frequent introduction, after a while, excites irritation, sometimes such as the patient cannot endure; and when the cancer is ulcerated, and the seat of tender, soft, and hæmorrhagic fungous growths, catheterism of the bowel becomes impossible. Here the disease cannot even be relieved, except by an operation. Mr. Mayo has recourse to division of the mass with the knife in cases of fungating scirrhus, when

the sensibility is so extreme, and the growth so large, that the bougie cannot be borne or introduced. A case is related in which this mode of widening the channel was productive of relief. Mr. Stafford* has recommended the incision of the bowel when, among other conditions, "carcinomatous ulceration is likely to occur; the freeing the part, and thus relieving the irritation kept up, is the most likely way, although it cannot be depended on with certainty, of preventing the mischief." Analogy is certainly strongly opposed to this idea; incising a scirrhous breast would be rather an unlikely way of delaying the occurrence of ulceration,—indeed experiments have actually shown, that it exasperates the disease (see p. 214); but if experience be on Mr. Stafford's side in the case of the rectum, analogical objections are of course without force.—A variety of materials have been employed as dilating bodies, cylinders of shredded lint,† elastic gum bougies, soft wax, tallow candles, Arnott's fluid-pressure dilator, the Fucus Esculentus,‡ ivory softened in an acid (Mr. Alex. Ure), &c.; the most pliable, smoothest, and least irritating of these are decidedly to be preferred in carcinomatous cases.—The introduction of a hollow tube, through which water may be injected, and the fæces washed away, is recommended, and proves sometimes (but this is rare) of real use: as Desault long since remarked, even flatus cannot, in many cases, be made to escape through it.—Galvanism has been tried as a means of stimulating the intestinal fibres to action, but little is to be hoped from its employment.

M. Amussat is in the habit of treating cancerous ulcers and fungosities by cauterization with a stick of caustic potass or nitrate of silver; following up this plan, after the separation of the eschars, by compression and dilatation. The dangers attending cauterization of the cervix uteri are increased in the instance of the rectum by the greater difficulty of the operation; and the amount of benefit, thus obtained, is not stated.

The process of breaking down fungous masses in the rectum can never be more than palliative: as an example of its results, I subjoin the following abridged account from the practice of M. Amussat. A man, aged sixty-two, presented a carcinomatous ulcerated ring surrounding the intestine, measuring an inch and three-quarters

* Ed. Med. and Surg. Journ., vol. li. p. 363. 1839.

† When these agents are kept *in situ* for a time, their effect becomes that of eccentric pressure; and M. Recamier relates a case where much benefit seems to have been obtained by their employment in this way.

‡ Aitkin, Prov. Med. and Surg. Trans., vol. vii. 1839.

in length, and commencing two inches and a half above the sphincters: the coarctation was almost sufficient to prevent the finger from passing into the narrow part. It was decided in consultation that the treatments by ligature, dilatation, or excision, were inapplicable;—the latter from the fear even of slight hæmorrhage, which, it was apprehended, must have carried off the patient. The most prominent granulations of the mass were consequently broken up with strong pincers: the operation is said to have been scarcely felt by the patient, and to have been attended with no hæmorrhage. Eight days after, M. Amussat commenced cauterizing, repeating the process every third or fourth day for a considerable time. The tumor was thus reduced to half its previous size; but, notwithstanding this, the patient's condition grew more and more alarming, and it became necessary to form an artificial anus to save his life.

Extirpation of the parts implicated in *primary* cancer of the rectum cannot be attempted when the disease is localized in the ordinary way; that is, when its lower boundary is seated some two or three inches above the orifice of the anus. Should an exceptional case present itself in which the morbid mass, though primary in the rectum, occupies a seat close to its external opening, the question of operation may be entertained, precisely as in the instance of cancer extending from the anus upwards into the bowel. I shall, in conformity with general habit, consider the operation, which has been proposed and performed for ano-rectal cancer, in the present place.

I must premise (as is indeed self-evident) that it is indispensable for success that the limits of the disease be within easy reach of the finger (three inches have been removed), and that the surrounding cellular tissue be healthy, so as to permit the bowel to be drawn down with facility during the operation. Should the entire substance of the parietes be affected, the case is unfit for operation, if the disease extend more than an inch above the anus.

Extirpation has been undertaken, either when the disease consisted of a distinctly circumscribed tumor, or of a stratiform mass involving part, or the entire, of the circumference of the bowel. Tumors have been removed by ligature or excision. The former operation, which saves the patient from the risk of hæmorrhage, may be performed with a silk thread, if the basis of the growth be narrow; with silver wire under the contrary circumstances.

The removal of a mass encircling the intestine is an operation of greater importance. Velpeau states* that a portion of the entire cylinder measuring an inch and a half in length, was

* Médecine Opératoire, tom. iii.

successfully excised by Faget in 1739 — defecation proceeding with the new anus as comfortably as in the natural state of the parts The credit of reviving this operation in the present century rests with Lisfranc. Among nine operations of the kind performed by this surgeon before 1830, five terminated by a cure —(but how long the "cure" may have held good, we are left to conjecture): in one instance the issue was doubtful; three cases ended fatally. In two of the latter, purulent effusion in the pelvis and phlebitis were the causes of death; the body of the third subject was not opened. Mr. Mayo has also removed in one instance a portion of the entire cylinder of the rectum; the patient was exceedingly benefited by the operation; she had prolapsus afterwards, however, and died of inflammation in the abdomen two years after.

Notwithstanding the alleged success of this operation in the hands of its reviver Lisfranc, general opinion is, even in Paris, strongly opposed to its performance. That it possesses any serious claims to attention, as a *curative* measure, it seems scarcely necessary to deny. The very essential element of success, namely, the total and complete removal of every particle of diseased substance, cannot, unless by accident, be attained. In some operations I have myself seen executed, the limits of the disease were obviously ascertained or divined by the touch only (and the fingers cannot be considered the best assistants for detecting—what is sufficient to reproduce the disease—a few microscopical cells); and, besides, the apprehension of wounding important structures in the neighbourhood prevented the surgeon from carrying the knife in directions where, he must have felt, it ought to have been made to act.

But the indication for removal of a portion of the rectum may become so strong, that the operation may be had recourse to, though no hope be entertained for a moment of its curing the disease. When obstruction of the bowel is complete, and a fatal issue from rupture of the intestines, in the manner described, becomes imminent, death may be warded off for a time by extirpation of as much of the morbid mass as is practicable. The free discharge of the function of the rectum is necessary for daily existence,—its restoration may consequently be attempted by extreme measures, and, in point of fact, extirpation effected for the relief of symptoms (see p. 244), provided the patient be willing and desirous to submit to an operation from which such amount of benefit alone is anticipated. The comparative rarity of visceral contamination in rectal cancer, affords, as far as it goes, justification of the operation, undertaken with such views.

But the importance and necessity of this operation, under the circumstances supposed, have been very seriously lessened by the comparatively recent revival of another surgical procedure for relieving such sufferers, and warding off imminent death. I refer to the establishment of an artificial anus. There are now at least eighteen cases* on record, in which an artificial anus has been established in the adult for the relief of symptoms promising momentarily to close in death. In eight of these cases the peritonæum was opened, and the anus formed in the groin (Littre's operation); in the remaining ten the peritonæum was not opened, and the anus formed in the lumbar region (the so-called Callisen's operation, modified in its details by Amussat). In three of the first eight cases the obstructing disease was cancerous; and one patient survived the operation twenty-eight hours, another twenty-eight days, the third three months and a half. In four of the second ten cases the disease was cancerous; one patient lived five months, one sixteen days, one ten days, and the fourth was alive two years and three months after the operation.

SECTION XII.

ANUS.

§ I. The neighbourhood of the anus is, according to Cruveilhier, more frequently the seat of cancerous disease than the interior of the rectum; and Velpeau goes so far as to affirm, that no part of the body is more prone "to lardaceous and even cancerous degeneration." But general experience does not corroborate these assertions; and it is remarkable that in Paris (the place of observation of both the writers named) the Registers assign but 13 deaths to cancer of the anus, while, as has been already seen, they ascribe 221 to that of the rectum. It is, no doubt, probable, that in some instances the affection has been set down as appertaining wholly to the rectum, when it may in fact have originated in, and spread from, the anus; but such errors cannot (this is at least fairly presumable) have occurred with any great frequency.

§ II. The disease commences by scirrhous infiltration of the lower part of the walls of the bowel; or, as a cutaneous excrescence; occurs as a secondary affection in maladies of syphilitic nature; occasionally succeeds, according to Cruveilhier, to irritated hæ-

* See Brit and For. Med. Rev., vol. xviii. p. 462. 1844.

morrhoids; and sometimes arises from extension of cancer from the scrotum.

§ III. The induration, attending the progress of the disease, obstructs the functions of the part, and defecation becomes difficult and painful; but as stricture is very rarely induced, (the anal orifice is, on the contrary, often widened by spreading ulceration,) the effects are much less severe, than when the disease occupies the interior of the rectum. The deposition of morbid matter is said by some observers to advance with particular rapidity in this situation; and I have certainly met with a few cases myself, fully proving the correctness of the statement. Death is sometimes hastened by inflammation and diffuse suppuration within the pelvis.

§ IV. Prolapsus of the lower part of the bowel, accompanied with an hypertrophous state of its walls, is frequently mistaken for cancerous induration: a case of this kind, in which the parts were removed by Boyer, under the impression of their being carcinomatous, is described and illustrated by figures in Cruveilhier's twenty-fifth Fasciculus. The induration was increased here by the presence of numerous phleboliths in the hæmorrhoidal veins.

§ V. Bayle is of opinion that elephantiasis of the vicinity of the anus (a local form of the disease, which he has carefully described) is only distinguishable during life from cancerous infiltration by the absence of cachectic symptoms, and the prompt benefit afforded by artificial dilatation of the lower part of the rectum.

§ VI. The treatment of rectal cancer is applicable to that of the anus.

SECTION XIII.

MESENTERY AND MESENTERIC GLANDS.

§ I. The mesenteric glands are sometimes, though very rarely, the seat of primary cancerous development. The species most common under these circumstances is said to be scirrhus: I have once seen these glands the sole seat of cancerous disease (p. 97); it was of the encephaloid species.

M. Bouillaud concisely refers (loc. cit.) to a case in which these glands formed an enormous soft mass of greyish-white colour and encephaloid aspect; other organs, and especially the colon, were similarly diseased.

§ II. The existence of cancerous disease of the mesenteric glands consecutive to, or accompanying, carcinoma of the intestines, might

be suspected, were very great abdominal enlargement to arise in the course of the latter affection; but I know of no means by which the diagnosis could be surely established. In respect of treatment, this is a point of little consequence. Should a tumor of great bulk be formed by cancerous disease of these glands and of the interjacent cellular membrane, the site of the tumor, taken in conjunction with the deficiency of symptoms connecting it clearly with any one abdominal organ rather than another, will afford aid in the diagnosis; but it must be confessed that a positive opinion as to the connections of the new growth frequently cannot be ventured upon.

§ III. Tumors of this origin sometimes perforate the intestine; the jejunum for instance (University College Collection): the perforation takes place from without inwards, but is followed by peritonitis, as though it had occurred in the converse direction.

§ IV. Masses thus seated may acquire very considerable bulk without causing distinct local symptoms; or even attracting the patient's attention.

SECTION XIV.

PERITONÆUM AND OMENTA.

§ I. The free surface of the peritonæum becomes in rare instances the seat of cancerous productions. Dr. Carswell, the first clearly to establish the fact, illustrates it in a figure representing a portion of the peritonæum, "to which were attached a multitude of tumors, varying from the size of a pin's head to that of a cherry or small orange, either single or grouped together. They were of a round, ovoid, or pyriform shape, attached by a broad basis, or a peduncle of considerable length. Some of them were very red, others quite pale; they were either entirely composed of cerebriform matter, or of this and a cellulo-vascular tissue in various proportions." *

§ II. The omenta, especially the omentum majus, is a not uncommon seat of colloid cancer; the morbid product spreads rapidly by infiltration amid the lax cellular membrane separating the serous laminæ.

§ III. These conditions, especially that of the omenta, are in the great majority of instances secondary.

§ IV. The detection of small nodules of peritonæal cancer during

* Elementary Forms of Disease, Fasc. Carcinoma, Pl. iii. fig. 1.

life is in the present state of knowledge impossible. The existence of chronic peritonitis (to which, besides, they may by no means give rise) affords no certain assurance of their presence; for cancers otherwise situated in the abdomen do, though less commonly, entail peritonitis of chronic course. Careful examination of the lungs will be adviseable for the purpose of ascertaining whether the peritonæal inflammation may not be of tuberculous origin.

§ V. Colloid cancer of the great omentum, spreading like a sort of apron in front of the intestines, gives rise to dull percussion-sound in proportion to its extent; the dull sound is equally extensive on both sides of the median line, and the existence of this state is generally connected with gastric symptoms of serious character, cancer of the stomach having been the forerunner of the omental disease.

SECTION XV.

POST-PERITONÆAL CELLULAR TISSUE.

§ I. The cellular membrane lying behind the peritonæum, between the folds of the mesentery, mesocola, mesorectum, &c., is far from being an uncommon seat of cancerous formation.

§ II. Cancerous masses thus situated are almost without exception primary:—I believe that, when of any magnitude, they have invariably been, at least, isolated formations.

Secondary nodules frequently follow in the liver; the pancreas, spleen, and kidneys resist the encroachments of the disease.

§ III. They are commonly composed of scirrhus and encephaloid in variable proportions and of variable consistence: the latter, however, very considerably predominating. An abundance of small vessels, inextricably interlaced, is a very usual constituent (University College Museum); and extravasations of blood are particularly frequent in this situation. Melanic pigment is sometimes present, fatty matter often abundant; I have never seen calcareous substance in their interior. (See p. 17.)

These masses attain very large bulk; I have seen them in two instances larger than the head of an infant; and Tacconi * refers to one measuring thirty-four inches in transverse diameter and twenty-four in height, and weighing thirty-two pounds. They are never encysted.

* Comment. Acad. Bonon., tom. v. pars ii. p. 81.

§ IV. Lobstein, who has examined these tumors with much care, points out the following reasons for believing that they commence in the cellular membrane lying immediately over the spine: they are intimately adherent to that part of the skeleton; they are in this situation composed of perfectly homogeneous structure, and confounded with the crura of the diaphragm; in proportion as their substance is examined further from the vertebræ, are its component lobes found to be more and more distinct, and even separated by loose cellular membrane; the parts most distant from the spot, thus presumed to be the original site of the disease, retain to the last somewhat of their natural appearance.

Originating thus, the mass spreads upwards, extends to the stomach, passes under the liver, penetrates between the laminæ of the transverse mesocolon, twists round the duodenum and pancreas, and, pushing forward the stomach, (with the small curvature of which it contracts adhesions,) forms a tumor in the epigastrium. Such tumors mould themselves upon these various parts and organs in so close a manner, that, after separation, the surface of the mass retains the impressions of the adjoining viscera. Lobstein has found the splenic artery and connected nervous filaments perfectly free and uncompressed, while the vein had already become more or less nearly obliterated from pressure. But this immunity of the nerves is not permanent. The same writer refers to dissections in which he discovered actual rupture of those organs from distension; in one instance a portion of the right vagus nerve was changed into a sort of elongated ganglion, from which three or four filaments, converted into material like that of the tumor, directly issued.

The cellular membrane between the abdominal parietes and the peritonæum is the occasional but rare seat of such cancerous formations.

§ V. The course of these tumors is rapid: their progress may in some instances be almost traced with the eye and hand, after they have attained a certain bulk.

§ VI. Enormous as they frequently become, and active as are their life and growth, these masses usually continue for a length of time in themselves harmless; that is, they are the actual seat neither of pain, nor inflammatory action. At a certain period, however, their enormous size produces its destructive influence, by constantly draining the system of nutrient fluids; and the patient dies in a state of exhaustion and emaciation, without having endured any local suffering. Professor Hermann of Strasburg

perished thus, according to Lobstein: an enormous tumor had originated in the pelvis, and in the course of six months extended to the umbilicus, without causing pain or any notable symptom; the patient attended to scientific pursuits to the day of his death.

The common effect of these tumors is, however, to act mechanically upon various of the abdominal viscera, and interfere thus with the discharge of their functions. This functional obstruction leads to irritative and inflammatory action. The nature of the symptoms will of course vary with the organ or structure which may more particularly have felt the compressing influence of the growth.

SECTION XVI.

SPLEEN.

§ I. There are few organs in the body in which cancer possesses so little practical importance as the spleen. The affection is so rare, especially as constituting the *main* evidence of the diathesis, that the fact of thirteen among 8289 deaths from cancer being ascribed in the Paris Registers to this organ, is calculated to surprise.

§ II. I have met with no example of cancerous disease limited to the spleen. The Clinique Médicale of Andral supplies one case in which the liver was the only other organ affected; in the majority of instances the stomach and omentum are likewise implicated. Cases are more numerous in which, the spleen being affected, the abdominal viscera have alone suffered, than others in which parts the most various (*e. g.* the brain, lungs, and bones) exhibit the disease.

The Museum of University College contains coloured drawings illustrating a very remarkable case (observed by Dr. Carswell at the Hôpital St. Louis) of encephaloid cancer involving the spleen, the tonsils, and the internal and external lymphatic glands. Such cases (those where the lymphatic system suffers deeply) are the only ones, as far as I have been able to discover, in which the spleen becomes cancerous without participation of the liver in the morbid state. The disease may pervade the spleen more extensively than the liver: an example of the fact has been recorded by Cruveilhier.*

§ III. Encephaloid is the species of cancer which affects the spleen. I have met with one or two alleged cases of scirrhus of

* Anat. Pathol. Livrais. xx. art. Os.

the organ; but the descriptions given apply to firm encephaloid: I omit allusion to cases where mere induration has been spoken of as scirrhus. Colloid does not appear to occur in this situation.

§ IV. Reference has been made in a previous page to the form (frequently assumed by encephaloid substance in this organ) which appears to connect the seat of the morbid product with the interior of the cells of the erectile structure. It will suffice to mention here that the nodules originating thus, acquire large size individually or by aggregation, and produce occasionally irregular elevations on the surface. Infiltration of the stroma of the organ does not occur; the nature of the tissue is likely to oppose the process. The deposition of melanic colouring matter in splenic cancer, though sometimes witnessed, is less common than certain *à priori* considerations might lead us to anticipate. (See Cancer of Pancreas.)

The organ may or may not be the seat of obvious enlargement.

§ V. The two sexes suffered with nearly the same frequency in the cases I have collected. No age appears to protect the spleen from becoming cancerous, but the organ is most commonly implicated in persons having passed the meridian of life. I know of no cause but the existence of the diathesis to which the occurrence of cancer in the spleen can be ascribed.

§ VI. Little of a satisfactory nature can be stated on the subject of symptoms; the evidences of disease elsewhere commonly engross the attention of patient and physician.

Pain is not commonly complained of, and, when observed, has rather appeared to depend upon local peritonitis, than upon the cancerous masses themselves: lancinating pain nevertheless sometimes exists. Tenderness under pressure, an uncommon attendant on the disease, is traceable to the peritonæum.

I cannot affirm, on the evidence of recorded cases, whether cancer of this organ exercises any special influence on the functions of digestion and hæmatosis; the invariable complication of disease of other parts interferes with the discovery of such influence, if, as is probable, it really exist.

When the deposition has increased to sufficient extent to produce increase of size, tumor is discoverable. The surface is uneven, nodulated, and the subjacent parts evidently of unequal consistence in different directions.

The tumor occupies the left hypochondrium, issues from under the ribs, and advances towards the middle line, especially at its upper part, and downwards towards the pelvis. It is conceivable that it shall produce in some cases *visible* bulging of the lower

third of the corresponding division of the chest; but this could only be in the instance of great accumulation, and has not been actually observed. Semicircular mensuration will earlier detect the increased dimensions of the affected side; at first showing that its width equals that of the right side, subsequently even exceeds it. But it is by percussion, carefully performed, that the limits of a splenic tumor may best be traced: taking some obviously dull point as a centre, the observer should practise percussion in various radiating directions, and, by the modification in the note occurring at different points, mark out the precise periphery of the mass.

Auscultation might be indirectly available (the lung and pleura being ascertainably sound) in disclosing the upper confines of a splenic tumor, through the deficiency of respiratory murmurs within those confines: but this is a point of little consequence.

Whether the spleen, enlarged by cancerous disease, becomes the seat of a vascular blowing murmur, as is sometimes the fact in cases of simple chronic enlargement, remains to be discovered.

The co-existence of similar disease in other and more important organs makes it impossible to assign to splenic cancer its share in the general disturbance of the system which is usually present. The cancerous cachexia is, in other words, generally well marked, but referrible to the presence of morbid growths elsewhere. The peculiar dull grey hue of skin which exists in chronic simple enlargement of the spleen (and which is so peculiar as to deserve the title of *splenic tint*) has not been noticed in any cases I have met with: the more marked discoloration of cancerous disease, or that indicative of hepatic obstruction—a common co-existence in cases of splenic cancer, as implied by certain statements above—would doubtless prevent its development, or render the characters of that hue obscure.

§ VII. The duration of cancerous disease does not appear to be influenced very materially by implication of the spleen. At least, in the few cases upon which this description rests, the affection proved fatal in periods varying between less than three months and a number of years.

§ VIII. I know of no means by which cancer in the spleen, not sufficiently extensive to produce tumor, may be discovered. The diagnosis of a splenic tumor is, on the other hand, sometimes a matter of difficulty, though commonly sufficiently simple.

Cancerous tumor, or infiltration producing increase of bulk of the *fundus of the stomach*, is distinguishable by its situation, by the amphoric special character of the percussion-sound over the mass,

commonly by the greater tenderness of the part, and by the existence of gastric symptoms. Besides, unless by extension from other parts of the organ, cancer of the fundus is, at the least, infinitely rare. —*Hardened fæces*, accumulated in the colon towards its left angle and descending portion, form a tumor, which may be taken for a splenic enlargement. But masses of this kind do not rise so high behind the ribs; the dull percussion-sound discoverable in some spots of the tumor is associated in others with the amphoric intestinal note, and disturbance of the bowels generally exists in a very marked manner. Still certainty can only be obtained by the exhibition of purgatives, which will remove the cause of intestinal tumor. But, unless much caution be exercised, the action of purgatives will rather mislead the observer than guide him to a correct diagnosis. I have known liquid stools produced daily for upwards of a week, and yet a tumor continue in the region now spoken of which eventually proved to be fæcal: under such circumstances the solid masses adhere to the cells of the colon, while the fluid matter makes its way along a central canal.—Masses of *omental cancer* generally affect both sides of the abdomen equally; splenic enlargement does not extend beyond the middle line; the percussion-sound is less purely dull, and does not reach in the direction of an enlarged spleen into the lower part of the left side of the chest.—The distinctive characters of tumors of the *ovary* and the *kidney* are described with the history of cancer of those organs.

Let it be supposed to have been ascertained that a given abdominal tumor is seated in the spleen, that it is cancerous, rather than the result of simple chronic enlargement, will be shown by its being uneven and irregularly lobulated on the surface, instead of being smooth and even; by the patient's not having suffered from ague more or less frequently; by the tumor undergoing no diminution in size through the influence of quinine; probably by the absence of the peculiar splenic tint of skin; and generally by obvious evidences of the diathesis and of the cachexia of cancer. The last two circumstances, together with greater evenness and similarity of size of the lobules felt on the surface, added in some cases to the existence of hydatid fremitus, will distinguish cancerous tumor of the spleen from those equally rare cases, in which enlargement of the organ is caused by accumulation of acephalocysts in its substance.

Bibliography.—*Bright*, Guy's Hosp. Reports, vol. iii. p. 401. 1836.

SECTION XVII.

PANCREAS.

§ I. The pancreas is among the rare sites of cancerous formation. Eminent observers have even been led to question that the gland ever becomes thus affected, except by direct continuity from neighbouring parts. Yet, in point of fact, although the term scirrhous has been perpetually misapplied by writers in speaking of induration of the pancreas, there is reason to believe that real cancerous induration of this species is among the most common forms of chronic disease of the gland.

§ II. Cancer occurs in the pancreas either as the solitary evidence of the disease, or in association with similar formations elsewhere. The former is probably the more common case; but in what proportion I am unable to determine. On the other hand, this organ sometimes escapes, when almost every nook and cranny of the frame are infested with the disease.

§ III. When cancer of the pancreas is solitary, it is, of course, primary. When associated with cancers in unconnected and more or less distant organs, it is almost invariably secondary, and simply signifies that the diathesis has reached the pancreas. When continuous in substance with carcinomatous productions in adjoining structures, pancreatic cancer is, as far as I can discover, almost invariably primary. While I find numerous cases in which the disease has spread from the pancreas to the duodenum, omentum, mesentery, liver, and even the supra-renal capsules and kidneys, I cannot feel satisfied that the propagation has in any case of really cancerous affection of the pancreas certainly taken place in the converse direction, though an assertion to this effect is very deliberately made by M. Bouillaud.* Possibly implication of the proper structure of the pancreas may in some cases arise consecutively to that of the circumjacent lymphatic glands; cancerous ulceration of the stomach having the pancreas for its basis, is not by any means necessarily attended with cancerous infiltration of the latter organ.

The existence of primary cancer of the pancreas has, as before stated (p. 97), been contested. Nevertheless the records of medicine furnish abundant evidence of its occurrence. Bayle long since

* Dict. de Méd. et de Chir. Pratiques, tom. iv. p. 481. 1830.

affirmed that he had himself seen a few examples of the disease; M. Recamier also relates a case in which the pancreas was the sole organ affected. Dr. Bigsby, in a valuable essay upon the diseases of this gland,* has analysed twenty-eight cases of cancer, in none of which was any organic change detected after death within the thorax or cranium; the abdominal changes (in addition to those of the pancreas) being confined almost solely to the stomach, liver, and duodenum. In eight cases, and these of long standing, no trace of disease was anywhere to be discovered except in the pancreas. Similar inferences are deducible from the still greater number of satisfactory cases collected in the elaborate volume of Dr. Claessen.†

When pancreatic cancer is associated with similar productions elsewhere, these are almost invariably seated in the adjoining lymphatic glands, the stomach, duodenum, mesentery, liver, or omentum. I have referred to a case where the kidneys were implicated. Unless in instances where the diathesis has seized upon almost all the structures of the body, it is extremely rare to find the pancreas and some *distant* organ affected in the same individual. Chester Browne records a case where the pancreas and testicle were the only organs cancerously diseased. In a case observed by Dr. Bright, "one small malignant tumor was found attached to the surface of the heart;" ‡ but in this instance several abdominal organs were affected with cancer, as well as the pancreas. I find no example of the disease coexisting in the pancreas and salivary glands.

§ IV. Scirrhus and encephaloid both occur in this organ. Of 35 cases, collected by Dr. Claessen, 26 were examples of the former species of cancer, 9 of the latter. Scirrhus is generally described as exhibiting the so-called "lardaceous" character, or the aspect of the mastoid variety; encephaloid occurs in the true cerebriform or hæmatoid conditions, and the existence of actual fungus hæmatodes (as in C. Browne's case) is not unattested. Of colloid cancer in this structure I have met with no example.

§ V. The entire of the gland may be affected, or a part only; the latter is the more common case. Of the middle portion, the splenic end, and the head of the organ, any of which may be separately diseased, the head appears to suffer somewhat the more frequently. The circumstance is not without practical interest, as upon it de-

* Edinb. Med. and Surg. Journal, vol. xliv. p. 93. 1835.

† Die Krankheiten der Bauchspeicheldrüse. Köln, 1842.

‡ Med. Chir. Trans., vol. xviii. p. 41. 1833.

pends the frequent secondary implication of the duodenum and pyloric end of the stomach, and (from pressure on the common duct) obstruction of the liver.

§ VI. Scirrhus usually affects the gland by irregular infiltration; de Haen* records a case in which the nodular character is stated to have existed, but the carcinomatous nature of the disease appears questionable. In a case of extensively disseminated cancerous disease observed by Langstaff,† "three moderate-sized tumors and several minute ones of a schirrous structure" were found in the substance of the pancreas. Encephaloid usually exhibits itself in the form of tumor.

§ VII. The pancreas, when cancerous, is almost invariably enlarged, though its proper texture may be rendered atrophous, more or less completely, from pressure of the infiltrated substance, as well as of the enlarged lymphatic glands encompassing the organ. In cases of encephaloid disease, considerable enlargement sometimes takes place: M. Duponchel‡ found a hæmato-cerebriform mass as large as a child's head occupying the site of the gland; of similar bulk was a softened schirrous mass carefully described by M. Trümpy.§ Writers frequently speak of the gland having exhibited twice, three and four times its natural bulk.

The form of the organ will of course vary with the amount and seat of accumulation. Generally speaking, the surface is uneven, tuberous, or botryoidal; but it may be perfectly smooth and even. When enlargement to any amount is limited to its middle division, the gland looks like a globular mass with a prolongation or offset on either side, as shown in a diagram by Dr. Bright.‖

§ VIII. Concerning the element of the organ primarily attacked, I am unable to speak with certainty; the general laws of the disease would justify the notion that infiltration commences in the intergranular cellular membrane. With the progress of events all the structures of the organ are implicated. The pancreatic duct is usually more or less obstructed in some portion of its course, and has been found almost or even completely closed; the mouth of the duct especially, when the head of the gland is enlarged, suffers closure. If the organ be still capable of secreting, retention of, and distension by, the secretion ensues. In one of Dr. Bright's cases

* Opuscula, tom. i. 217. † Med. Chir. Trans., vol. xviii. p. 253. 1833.

‡ Bulletin de la Soc. Méd. d'Emulation, p. 76. 1824.

§ Hufeland's Journal, Stück xii. S. 35. 1830.

‖ On Disease of the Pancreas and Duodenum, in Med. Chir. Trans., vol. xviii. p. 42. 1833.

the duct was wide through the "greater part of its passage through the diseased mass; but was obstructed, so as not to allow the passage of a small probe, when it reached the more healthy part of the organ." In a case of nodular cancers of the right extremity of the pancreas, the duct, almost obliterated at its termination, was sufficiently dilated elsewhere to admit the little finger.* M. Cruveilhier† found the duct so much dilated as to simulate a cyst; the openings of the tributary ducts explained the true nature of the appearances.

§ IX. The local course of the disease is the same in this, as in other situations. Destructive changes are, however, slow to occur; though not to the extent which must be inferred, were all cases, described by writers as examples of scirrhus, to be really classed with that disease. In 7 of 37 cases collected by Dr. Claessen no appearance of softening or ulceration presented itself, although the disease had existed in some instances for several years, and in none less than nine months. Almost all traces of the pancreatic structure are removed by softening and ulceration in some cases; as, for instance, those recorded by Heberden,‡ Abernethy,§ and Duponchel.

In a case described in a valuable paper by Dr. F. Battersby,‖ a thin, translucent, horny cyst, about the size of a walnut, lay embedded in a mass of chondroid scirrhus infiltrating the gland.

§ X. The most important local influences exercised by the disease are the development of adhesions between the organ and the stomach, duodenum, &c., the obstruction of excretory ducts, and the propagation of the cancerous affection itself to the adjacent textures. With the absence or presence of these alterations the symptomatic course of the disease will of course completely differ.

§ XI. The stomach has been found simply injected; in a state of cadaveric softening; distended (with or without hypertrophous thickening of its coats,—the latter only where notable obstruction existed towards the pylorus) or contracted; adherent at, or near, the pylorus to the pancreatic mass, under which circumstances that portion of the stomach has been itself unchanged, thickened, or scirrhous with or without ulceration; perforated in the situation of adhesion in one or several¶ places; filled to distension with chocolate-coloured fluid, or liquid or grumous blood, when perforated vessels have or have not been readily discoverable.

* R. W. Smith, Dublin Med. Journ., vol. xvii. p. 382.

† Essai sur l'Anat. Pathol., tom. i. p. 287. 1816.

‡ Commentaries, p. 460. § Lancet, vol. xii. p. 66.

‖ Dublin Med. Journal, vol. xxv. p. 219. May, 1844.

¶ Hasenöhl, Histor. Med. Feb. petech. p. 60; quoted by Dr. Claessen.

Precisely the same series of changes have been met with in the duodenum; I find actual perforation of this part of the intestine more frequently recorded than of the stomach; but morbid states of the latter are on the whole more common than of the former.

The ductus communis choledochus and the hepatic ducts in the liver itself may be greatly widened. Mr. R. W. Smith (loc. cit.) has seen the latter capable of admitting two fingers from place to place. In a case recorded by Todd * (the patient was a female aged fourteen), the common and hepatic ducts were so enlarged as to form a distinct tumor, which upon puncture during life furnished two quarts of bile, and after death was found to contain another quart of the same fluid.

The gall-bladder has been found greatly distended with bile (when the necessary obstruction existed), and its coats proportionally thickened; in Mr. R. W. Smith's case it passed down below the umbilicus towards the right iliac fossa, and was mistaken for a ventral hernia. Gall-stones are rare, having occurred but in two cases.

The general tract of the intestines commonly continues sound to the last; ulcerations have been noticed once at least,† and in another instance ossification of the small intestines is said to have existed in the neighbourhood of adhesions to the morbid mass.‡ Their interior may be more or less completely filled with blood. In Dr. F. Battersby's case the colon was much contracted, and its sigmoid flexure appears to have been the seat of commencing formation of colloid cancer.

The liver may be healthy, enlarged, and indurated, anæmic (Abercrombie), studded with scirrho-encephaloid nodules, or small, dense, with thickening of its cellular structure (cirrhosis).

The spleen has been found simply gorged with blood, or in a few instances greatly enlarged and indurated. Reporters of cases rarely refer to the organ, whence it is inferrible that it is usually exempt from disease. I have not met with any example of coexisting cancerous development within it; and, as shown by Velpeau's striking case already referred to (p. 102), even in the instance of almost universal dissemination through the system, while the pancreas suffers, the spleen may escape.

The extra-abdominal organs do not present any morbid state, which can be considered a dependence on the pancreatic disease.

* Dublin Hospital Reports, vol. i. p. 325.

† Urban, in Hufeland's Journal, Stück xi. S. 87. 1830.

‡ Trümpy's case before referred to. The patient, a female, was totally without nternal organs of generation.

§ XII. The causes specially leading to the generation of cancer in this organ are wrapped in obscurity.

In respect of age and sex, I find 40 cases which may be arranged as in the subjoined table.

Age (at death).	Males.	Females.	Totals.
10 to 20	–	1	1
20 — 30	1	1	2
30 — 40	3	4	7
40 — 50	4	3	7
50 — 60	2	5	7
60 — 70	3	4	7
70 — 80	1	1	2
80 — 90	–	1*	1
Not stated	5	1	6
Totals . .	19	21	40

These figures give a pretty close representation of the general law of cancerous diseases in respect of age. Scirrhus of this organ has been known to originate during intra-uterine life. On first view it would appear that sex is without influence in directing the morbid action towards the pancreas; but as diseases of this organ in general are considerably the more frequent in males (of 322 cases collected by Dr. Claessen, 193 occurred in men, 129 in women), the special tendency of the female to cancer must be admitted to prevail even in respect of this organ.

§ XIII. All that can be said with any certainty concerning the duration of the disease is, that the sufferings it entails are commonly prolonged through some years. On the other hand, a rapid course has been observed. Dr. Percival† describes a case, where the fatal issue took place in three months from the outset; the individual observed by M. Urban died within nine months from the occurrence of the first symptoms.

§ XIV. The symptomatology of the disease is among the most obscure parts of the subject. The symptoms of scirrhus and of encephaloid do not require to be separately examined; they are in fact, perfectly identical.

(1.) Carcinoma of the pancreas may run a completely latent course, if death occur before the supervention of softening; unquestionable examples of the fact are on record. But at the same time the frequency of such cases has been much exaggerated, in con-

* R. W. Smith, Dub. Med. Journ., vol. xvii. p. 382.

† Trans. King's and Queen's Coll. Physicians, vol. ii. p. 133.

sequence of the almost complete ignorance prevailing upon the anatomical distinctions of these diseases.

(2.) *Tumor*, deeply seated in the epigastric region, or between this and the umbilicus, solid, fixed, and defined, is discoverable in a certain proportion of cases, and, though commonly inappreciable until emaciation has made notable progress, has in some instances been the first evidence of the disease detected. This tumor is sometimes attended with pulsation (Sandwith,* Fletcher,† Battersby) and blowing murmur. In Dr. Battersby's case, where a cyst was seated in the scirrhous stroma, the yielding character of the tumor, the pulsation, blowing murmur, and apparent systole and diastole, produced a series of signs simulative of those of aortic aneurism; eventually (probably in consequence of the encroachment of solid structure on the cyst, and adhesions of the mass to the spine) these signs disappeared, with the exception of the blowing murmur: this murmur is, in such cases, not audible in the back.

Pain is an ordinary symptom both before and after the occurrence of softening. Before this anatomical change arises, it is in a few cases slight, in the majority severe; varies in character, having been mistaken for that of rheumatism, of aortic aneurism, &c.; is limited to the pancreatic region, or radiates with most violent pangs to the chest and back; may be increased by the gentlest touch, or, on the contrary, relieved by strong pressure; and is in some cases greatly exasperated by the erect, and proportionally assuaged by a stooping posture (Sewall, Abernethy, Battersby). In 3 of 8 cases of softened scirrhus pain was altogether absent.

Vomiting of solids and liquids (where no other distinct morbid state, but that of the pancreas, was present to explain the symptom) occurred in 3 of 7 cases of unsoftened cancer, in 2 of 8 where softening had been established. Vomiting of blood and discharge of that fluid *per anum* is peculiar to the latter class of cases, and signifies the occurrence of perforation of the stomach or duodenum, and destruction of the walls of some vessel or vessels. It is remarkable that (as is proved by a case recorded by Dr. Greene‡) vomiting may be absent altogether till within a very short period (a fortnight in this instance) before death, although, in addition to the pancreatic disease, there may be very considerable contraction of the pylorus.

Abundant *watery discharge* from the mouth (pancreatic sialor-

* Edinb. Med. and Surg. Journ., vol. xvi. p. 381.

† Provincial Med. and Surg. Journ., January 20, 1844.

‡ Dublin Medical Journal, vol. xxv. p 172.

rhœa) is more rarely observed than the confident statements of some authors would lead us to expect. It was a troublesome symptom in 2 of 7 cases of unsoftened scirrhus, in 4 of 8 instances of softening. In a case observed by Rahn,* upwards of two quarts were discharged daily. That the discharge really comes from the pancreas, (as a favourite German theory holds, and as Dr. Bright, loc. cit., inclines to believe) may be considered somewhat doubtful; the fluid appears really to be furnished by the stomach, though, as must be granted, under the influence of the pancreatic disease. Dr. F. Battersby (loc. cit.) has collected evidence with much pains in favour of the pancreatic origin of the liquid.

The *appetite* fluctuates in every conceivable way; cases are not wanting in which it has been retained to the last. The *tongue* and mouth may be excessively moist, apparently saturated with fluid even, while all furred appearance is totally absent. In a case contributed by Mr. Mac Donnell to Dr. Battersby this was very marked; and I have at present under my care an old woman (labouring, as I believe, under this disease), whose smooth white tongue looks as though it had been macerated in water; she discharges at least a pint of tasteless fluid daily. The condition of the *bowels* is not very frequently mentioned in the narratives collated by Dr. Claessen; constipation is stated to have existed in 4 of the 15 cases, diarrhœa in 1, alternations of both these states in 3.

The amount of *emaciation* varies. It was carried to the extreme of marasmus in 5 of 15 cases; some few patients, on the contrary, had not perceptibly lost flesh.

The only certain evidence that the disease has passed from the unsoftened to the ulcerated state is supplied by the *discharge of blood* by the mouth or anus; the absence of this symptom does not, however, by any means prove that the pancreatic mass has not yet softened. Curiously enough, Dr. Claessen's analysis leads to the inference that the sum of symptoms is (on the average of cases) more considerable before than after the occurrence of softening; though, on the other hand, as has been seen, the disease occasionally continues latent before, but not after, this change.

In cases where adhesion of the head of the pancreas to the pyloric orifice of the stomach occurs, and is followed by thickening of the walls of that orifice, *periodical vomiting* may ensue, although the appetite remain unaffected.

The most important class of cases, clinically considered, is that

* Diagnos. Scirrhorum Pancreat. 1796.

in which *implication of the liver* and its excretory system arises through pressure of the enlarged pancreas on the common duct. Under these circumstances jaundice of course takes place, and the symptoms appertaining to the pancreas are lost sight of amid the more serious disturbances dependent on the liver. In some cases of this class Dr. Bright* observed *discharge of fatty matter* from the intestines, and endeavoured to trace the symptom to "disease, probably malignant, of that part of the pancreas which is near the duodenum; and ulceration of the duodenum itself." In another part of the same essay, he attempts to refer the fatty discharge to the "malignant" character of the disease rather than to its special situation — regarding the symptom as "diagnostic of the *nature* of the diseased action rather than of its *seat*." It is sufficiently clear that neither of these opinions is tenable; cancer perpetually occurs without any such fatty discharges: nor are these met with at all frequently in pancreatic disease, and they never occur unless there be coexistent obstructive derangement of the liver. Besides, these discharges occur under circumstances excluding the idea of the existence of serious structural disease of any kind or of any organ. I had some time since a man under my care who was in the daily habit of vomiting a quantity of oily substance, which cooled into a tallowy-looking stratum upon the surface of the ejected matters. He was delivered completely and (so far) permanently of this distressing affection by a treatment wholly empirical, consisting of local counter-irritation, followed by the internal use of hydrocyanic acid and subsequently the trisnitrate of bismuth.

SECTION XVIII.

LIVER.

§ I. If the statement be understood to refer to primary and secondary cancer taken together, it may be affirmed that no organ in the body becomes so frequently cancerous as the liver; the fact is illustrated on a small scale in the results obtained by Herrick and Popp (p. 93). Hepatic cancer, either actually primary, or assuming the importance of the primary disease in respect of symptoms, is also extremely common; 578 of 8289 deaths from cancer in Paris are ascribed to the liver. Of all organic affections of the liver this is probably the most frequent; cirrhosis alone bears comparison with it in this respect. Nevertheless, so much of the history of cancer of the liver has been of necessity given with the general account of the

* Loc. cit. Med. Chir. Trans., vol. xviii.

disease, that the space devoted to it in the present place will be comparatively limited.

§ II. Hepatic cancer is either associated with other cancers, or solitary. When associated, it is almost invariably consecutive: in other words, primary cancer of the liver is slow to contaminate remote parts; even the spleen commonly escapes. The disease, nevertheless, spreads by contiguity in a remarkable manner in some cases. The most common course it pursues, is along the lesser omentum to the stomach and duodenum; it sometimes extends upwards, implicating the diaphragm, and even, as Cruveilhier records, may perforate this structure. Infiltration occasionally spreads along false membranes connecting the organ with other parts. The right supra-renal capsule and kidney have been known to grow cancerous apparently through the mere influence (p. 104) of close proximity. The gall-bladder becomes cancerous in a certain proportion of cases.

§ III. Encephaloid occurs in the liver in the pure cerebriform state and in the solanoid and hæmatoid (University College Museum) varieties; scirrhus especially in the chondroid and napiform varieties; I have never seen colloid in this organ. The scirrho-encephaloid combination is of the most frequent occurrence; next follows the solanoid variety. Fibriform stroma abounds in the scirrhous nodule. Punctiform deposition of melanic pigment is rather common; a singular shining appearance, resembling that of black granite (University College Museum, Nos. 1867, 1869) is thus produced in certain tumors; in others the hue is uniformly and deeply black.

§ IV. Secondary cancers affect a preference for the superficial parts of the organ; the seat of primary formation is more variable: the pathological signification of these facts has already (p. 98) been commented on. The portion of the liver corresponding to the umbilical fissure has by different persons been pointed out as a favourite site of the larger cancerous masses. No part of the organ is exempt from their formation.

§ V. When primary, cancers in the liver are usually limited in number; in rare instances, a single mass only exists. When secondary, the number is considerable, and even hundreds of these growths are far from uncommon; it has appeared to me that their number is usually greatest when they occur consecutively to cancer of the stomach. It sometimes happens, that, while the main disease is seated elsewhere, the liver contains but a single growth; under these circumstances it appears to me probable that the hepatic formation may, in some instances at least, have occurred independently of any co-existing cancer. The size of cancerous masses in this

organ varies; numerous preparations before me show that they reach their greatest dimensions in the central parts of the organ. I have rarely seen them larger than a cricket-ball; they are said to attain the bulk of the fœtal head.

§ VI. I have elsewhere (p. 15) described the mode of deposition prevailing in the liver. The hepatic nodule is sometimes of stellate form, or is at least irregularly indented at the periphery, manifestly in consequence of the irregularity with which the lobules are encroached upon. This irregularity is rendered more obvious still by close examination; for in the very centre of such nodules (in perfect analogy to the usual mode of composition of the tubercle of phthisis) I have occasionally found most delicate strata of the natural tissue of the organ dividing the morbid mass into compartments. I have known nodules, which looked tolerably vascular, owe the appearance almost completely to such imprisonment of natural tissue: by keeping, these fragments of liver sometimes acquire a yellowish tint.

§ VII. It has been remarked by several observers that cancerous growths of the liver, when in the nascent state, accurately represent in point of form and size the "granules," or "acini,"* of the organ. Writers holding widely different theories of the origin of cancer agree in noticing the fact; they disagree in its explanation. Dr. Carswell infers that the morbid substance must be introduced in the same order as the natural elements of nutrition; otherwise a change of bulk would advance with those of colour and consistence. Cruveilhier holds that the venous capillaries are in the hepatic "granules," as elsewhere, the original seat of formation. Dr. Hodgkin, on the other hand, believes that the cellular membrane accompanying the vessels and ducts is the texture in which the diseased formation commences.

I have invariably found that when a section of the liver, adjoining cancerous nodules, is examined with a common lens, the surface may be seen to be sparsely studded with minute milky, though somewhat transparent, spots, looking as if the discoloration, which softens off at the edges, were produced with the point of a brush. The lobules appear manifestly *infiltrated* with the milky-looking material, which is most abundant towards their centre: their outline and size exhibit no obvious change. The nucleated particles of the liver may sometimes be distinctly detected amid those of the cancerous substance. I have not succeeded in ascertaining by direct

* As is well known, much confusion has existed in the use of the terms "granule," "acinus," and "lobule." It is perhaps as well to observe, that I use the word "lobule" in the sense given it by Malpighi and Mr. Kiernan.

observation the precise relationship of the venous elements of the lobules to the cancerous matter they contain: that the capillary veins are, in cases of secondary disease, the earliest seats of cancer-cells, is a point to which arguments of various kinds (see p. 106) appear to have given almost full demonstration. I have never clearly seen cancerous infiltration of the capsule of Glisson.

The vascularity of hepatic cancers differs greatly. As a general truth, it is limited; but, on the other hand, vessels exist in abundance in some tumors, and interstitial effusions of blood (p. 79) are not uncommon in specimens of the hæmatoid variety.

§ VIII. The clearly defined, almost sharp, outline so frequent in cancerous nodules of the liver, would appear incompatible with their production by infiltration; there is no tendency in these masses to spread by the ordinary process amid the surrounding cellular membrane. But this is a simple consequence of the fact (and an indirect proof of it) that the lobules are the seat of deposition. I find it stated by Cruveilhier, that these tumors not unfrequently present *ramifications*, especially along the veins; such ramifications it has not occurred to me to observe. It is certain, however, that the larger and even smaller veins (as visible with the naked eye) are frequently loaded with cancerous matter.

§ IX. I have never seen the general bulk of the liver reduced notably below the natural standard; but in some cases atrophous absorption of structure goes on in such uniform proportion to the cancerous deposition, that no enlargement occurs. In other cases, the dimensions of the organ are very greatly increased; it has been known to attain a weight of twelve, fifteen, and twenty pounds.

§ X. The tissue surrounding cancerous nodules may be perfectly natural in appearance, highly vascular, or tinged yellow or green from obstructed movement of the bile. Inflammatory softening is of extreme rarity. I have not observed either cirrhosis (see p. 88) or fatty disease* in connexion with cancer. Hypertrophy of the proper structure sometimes occurs; more common is atrophy, as above explained. Partial atrophies may result from pressure of vessels of secondary order; general atrophy from that of the large trunks. The gall-bladder may undergo enormous dilatation, where the morbid growths exercise pressure on the ductus communis; M.

* Fatty disease is, as far as I have seen, a rare affection under all circumstances in this country. Its rarity in phthisis in London, as compared with its frequency in the same affection in Paris, is, as I have elsewhere (Physical Diagnosis of Diseases of the Lungs, p. 215) remarked, a very striking fact; striking, because it seems very seriously to affect the plausibility of the common explanations of the occurrence of the fatty change in that disease.

Bouillaud has seen it as large as the fœtal head. The peritonæal investment of the liver is generally thickened irregularly; the vessels lying beneath the peritonæum enlarge; adhesions form between the liver and adjacent parts. The affection of the peritonæum may implicate its entire extent; this, however, is very rare. The mucous membrane of the stomach and duodenum is in a certain proportion of cases the seat of chronic inflammation; less frequently is that of the ileum or large intestine thus affected.

§ XI. Of special causes of hepatic cancer none have been discovered. I find the disease more frequent in males than females (in the proportion of twenty-seven to eighteen) in cases collected from various sources. Very rare before the thirty-fifth or fortieth years, the affection is most common between the ages of fifty and seventy; two-thirds of the total number of deaths occur within the latter periods. Persons of the most advanced age sometimes become its victims.

§ XII. The duration of hepatic cancer varies extremely. There are instances in which it runs a slow and almost latent course for years; others, in which it assumes much of the characters of an acute affection. M. Andral relates a case in which death occurred within three weeks from the occurrence of the first symptoms: the patient perished with fever, great tenderness in the hepatic region, and jaundice; the structure of the liver between the cancerous growths exhibited no morbid change of any kind. The enlargement of tumors in this organ sometimes takes place with extreme rapidity: from day to day almost, whether they be primary or consecutive, a manifest increase of bulk may be detected.

§ XIII. Many of the symptoms of cancer of the stomach are observed in cases of hepatic carcinoma: thus, eructation of air more or less fœtid, loss of appetite, sensation of fulness and uneasiness in the epigastric and hepatic regions; obstinate constipation, alternately sometimes with diarrhœa; vomiting of glairy or bloody matters, or of food; straw-coloured discoloration of the skin, emaciation, and excessive depression of spirits, and moroseness of temper; are all common to the disease in both situations. And the reason is obvious: the stomach and intestines are themselves very frequently diseased.

Vomiting may be the effect of inflammatory changes in the stomach, of simple ulceration or coexistent cancer of this organ; or, as in a case related by M. Andral, may be a mechanical result of pressure of hepatic growths on the pylorus.

Pain is of variable occurrence and character. I have known the liver to contain primary growths of large size, softened, and in

some number, and yet pain and tenderness under pressure continue totally absent to the last. Doubtless the proximity of the tumors to the surface, or their central position, as has been suggested by M. Andral, may have some influence in determining the presence or absence of pain; but most certainly the differences observed cannot always be thus explained. The pain is sometimes, though rarely, distinctly lancinating; in many cases it amounts to no more than a vague sensation of weight and discomfort. The frequency with which it radiates to the right shoulder has been greatly exaggerated; at least, it has never occurred to me in cases of hepatic cancer to observe radiating pain *limited* to that region: it sometimes, however, spreads along both sides of the thorax, to the arms, and even the hands.

The conditions specially connecting the disease with the liver are tumor in the hypochondria, jaundice, and ascites.—Enlargement of the liver gives rise to tumor of proportional bulk, as ascertainable by application of the hand, circular mensuration, and percussion; and, should the increase of bulk occur particularly in an upward direction, by the deficiency of respiration, ascertainable by auscultation of the infra-axillary and mammary regions. The surface of the enlarged organ is irregular and nodulous from the projection of the growths on its surface. Should ascites coexist, it may be impossible to detect this peculiar character of the surface of the liver; removal of the fluid in the peritonæum will render it evident. But it is to be remembered that enlargement of the liver does not necessarily occur: still the nodulous character may, even under such circumstances, continue an available sign; where actual diminution of bulk takes place, any evidence of this kind is with great difficulty, to say the least, discoverable.

Jaundice, without ascites, occurs in somewhat less than half the cases, and, so far as I have observed, only appears under the influence of pressure directly exercised on the large biliary ducts: it is hence often connected with infiltration of the lesser omentum. Cases, however, are sometimes met with, in which no such obstruction has been discovered: Andral records some of the kind. Ascites, without jaundice, is a much less frequent consequence of the disease. When slight in amount, the accumulation of fluid appears to result from peritonæal irritation; when abundant, from pressure of the large venous trunks. Jaundice and ascites combined occur in a fourth or fifth of all cases; in about a third of the whole number neither of these symptoms is present. Either of them may be the sole existing symptom of hepatic disease; jaundice, however, as just signified, much more frequently than ascites.

Towards the close of life, œdema of the lower extremities commonly occurs. When the liver is much enlarged, præcordial distress, breathlessness under the least exertion, and palpitation, are usual symptoms; syncope even sometimes occurs: these symptoms are at once of mechanical and of functional origin; the connexion of the liver and heart in respect of the circulation readily explains this. Hiccup sometimes becomes an annoying and even serious symptom, the result of irritation of the diaphragm.

The state of the urine in hepatic cancer has already (p. 117) been described.

§ XIV. Sufferers from hepatic cancer generally perish from the effects of the cachexia, combined with those of total derangement of the digestive organs. Life may be brought to an abrupt close by acute peritonitis produced by rupture of one of the tumors into the cavity of the peritonæum; or by pleurisy, the result either of the mere irritation of the contiguous disease, or, as in the case recorded by Cruveilhier, of actual perforation of the diaphragm.

§ XV. The diagnosis of cancer of the liver may be extremely simple, or almost impossible. Where great enlargement of the organ exists, and this enlargement may be *felt* to depend on the presence of nodular masses of variable size,—where there exist pain in the hepatic region, jaundice, ascites, emaciation, and great digestive disturbance,—and where the individual is of advanced age, —there can scarcely be a doubt entertained as to the existence of hepatic cancer. On the other hand, where not one single one of these symptoms exists,—where the disease is, in fact, almost latent, —the existence of cancer obviously may not be suspected, much less can it ever be substantiated. No few patients have been treated for years, as is most justly observed by Cruveilhier, for hypochondriasis, in whom, in point of fact, cancers had throughout been growing luxuriously in the liver.

Ascites coexisting with diminished bulk of the liver, a combination of morbid conditions which occurs in very rare cases of cancer of the organ, could scarcely be distinguished during life from the effects of cirrhosis. The existence of cancer in other regions, or marked signs of the cachexia, could alone under such circumstances justify the diagnosis of cancer.

Enlargement of the liver from fatty infiltration may be distinguished from that caused by cancerous disease by the smoothness and absence of tuberosities on the surface, and the perfect deficiency of hepatic symptoms. The connexion of fatty disease with phthisis, in some countries, is so positively established as to be made available in the diagnosis.—Enlargement of the liver from the presence

of a simple serous cyst has sometimes been observed. Hesse * records the case of a woman whose abdomen was enormously distended with a fluctuating tumor; about thirty pints of slightly turbid fluid, without smell, were discharged by puncture, and five pints every day for eight days after. On the woman's death, a year later, no hydatids were discovered, nor is mention made of their having appeared at any time.—An hydatid cyst of large size, though increasing greatly the bulk of the liver, does not produce irregular tuberousness of the surface; if the cyst do not contain a vast quantity of fluid, the hydatid fremitus may be detected;—if it do (and the fremitus be thus rendered obscure or inappreciable), the manifest fluctuation will distinguish the disease from cancer. Local protuberance from accumulation of bile †—a condition which (when it occurs) is generally the rapid result of external injury—is distinguishable from cancer by the limitation of the affection to a single spot, by the fluctuation, and by the previous health of the individual.

Tumor connected with the liver may be mistaken for enlargement of the kidney; the means of distinguishing the cases are enumerated in the chapter descriptive of Renal Cancer.

§ XVI. The treatment of cancer of the liver should be generally conducted as that of cancer of the stomach. It has appeared to me that the progress of the affection has been stayed, by liberal inunction of the iodide of lead ointment over the hepatic region, and the internal administration of liquor potassæ in infusion of taraxacum.

SECTION XIX.

GALL-BLADDER AND DUCTS.

Extension of cancerous infiltration from the lower surface of the liver, or from the adjacent cellular membrane, to the walls of the gall-bladder, is sometimes witnessed. The disease is said to occur even primarily in this situation.

M. Bouillaud observed a case in which the walls of the vesicle infiltrated with cancer, and deeply and extensively ulcerated, had become adherent to the arch of the colon: perforation of the intestine had not occurred.

* Horn's Archiv., September, 1829.

† Barlow, in Med. Chir. Trans. vol. xxvii. 1844.

CHAPTER II.

CANCER OF THE RESPIRATORY ORGANS AND APPENDAGES.

SECTION I.

NARES.

§ I. Cancerous productions in the nares, most commonly encephaloid, produce the mechanical effects common to all obstructive diseases of these passages,—such as interference with the ingress and egress of air from the lungs, and, as has occasionally been witnessed, obliteration of the lachrymal sac followed by fistula lachrymalis, &c. They originate in the Schneiderian membrane.

§ II. Tumors appearing in the nasal fossæ may not have originally formed within those cavities. Facts will be referred to, fully proving this statement, in the description of Cancer of the Cerebral Meninges, and Antrum; and the means of distinguishing growths springing from these different sites pointed out.—M. Cruveilhier records a singular case wherein a mass, having the appearance of a fibrous polypus, occupied the right nostril, and was, on post-mortem examination, found to consist of a portion of dura mater thickened, exhibiting a fungous surface, and containing within it the corresponding parts of the arachnoid and pia mater along with some cerebral substance and pus; the whole formed a hernia through the cribriform plate of the ethmoid bone. The chief safeguard against ill-consequences in such a case appears to be in the fact, that the state of disease must be so advanced as to contra-indicate any attempt at operation. The commemorative symptoms will also sometimes guide in the diagnosis, and should, under all circumstances, be carefully inquired into. The *seat* of the disease being ascertained to be the nose, its *nature* remains to be established. It may be mistaken for different kinds of nasal polypus (fibrous, cellular, and gelatinous); but the ordinary effects of cancer are usually sufficiently marked to ensure an attentive person from error.

§ III. Palliative treatment only is indicated in cases of cancerous disease of the nostrils; should respiration be seriously impeded by abundant growth of encephaloid fungi, these may be cut or torn

away, as a mere measure of temporary utility; they are rapidly reproduced. The hæmorrhage resulting from their excision in particular may be extremely difficult to control.

SECTION II.

FRONTAL AND SPHENOID SINUSES.

§ I. The following particulars of a case of carcinoma of the frontal sinuses are abridged from the original history by Desgranges, republished in L'Expérience by the learned editor M. Dezeimeris.* A man, aged twenty-five, presented himself at a provincial hospital with a tumor situated at the root of the nose. Two years before he had had confluent variola, attended with violent cephalalgia, from which he was never afterwards wholly freed. He suffered besides from stuffing in the nostrils, frequent sneezing, and desire to clear the nose. The frontal pain increasing, occasionally assumed the lancinating character; and, at the end of fifteen months, the bone, immediately above the root of the nose, appeared to bulge out. This prominence gradually increased, was at first hard and insensible, but subsequently became somewhat tender. Impaired olfaction, severe itching in the nares, with puriform discharge, now supervened. On his admission, the external tumor was as large as a hen's egg, the investing integuments swollen, œdematous, and slightly red. The bone covering the tumor seemed exceedingly thin, and obscure fluctuation was perceptible. A "malignant fever" carried off the patient fifteen days after his admission. The prominent part of the bone was found to be extremely thin, cracked, and ready to separate into fragments. On removing this lamella—the anterior wall of the frontal sinuses—a tumor springing from the lining membrane of those cavities presented itself, somewhat flattened on its posterior, convex on its anterior surface. Smooth and reddish externally, a section of this growth exhibited superiorly a solid, firm, "sarcomatous or scirrhous tissue," very slightly tinged with red,—inferiorly a humid, redder, and softer substance, as it were decomposed and covered with a sort of "purulent mucilage;" the latter could not be removed without scraping away some of the tumor, which then bled. The septum of the sinuses had totally disappeared; the size of these cavities was greater than natural; and the opening, communicating with the ethmoid cells, widened and plugged with swollen pituitary membrane, apparently inflamed

* No. xxxvi. Avril, 1838.

and suppurating. The internal plate of the frontal bone presented its natural aspect; the posterior lamella of the sinuses, of ordinary thickness, was of red-brown colour, as in the bones of young subjects. The corresponding dura mater adhered but slightly to the cranium; towards the crista galli appeared varicose vessels, which bled abundantly. The venous sinuses, as also the vessels of the dura mater and cerebral substance, were likewise loaded with blood.

The characters of an encephaloid tumor partially softened may be recognised in these details. The progress of the disease was closely similar to that of perforating meningeal cancer; and the healthy state of the posterior wall shows that extirpation of the tumor might have been undertaken with reasonable prospect of ensuring temporary relief.

§ II. Dr. Carswell* has given an engraving of an encephaloid growth originating in the sphenoid sinuses, and protruding through the substance of the bone into the cavity of the cranium. Dr. Bright† speaks of a similar case; the patient had suffered from facial neuralgia.

SECTION III.

EPIGLOTTIS.

§ I. Haller‡ briefly mentions the case of a woman who suffered from aphonia, and was found, on post-mortem examination, to have an "ulcerous tumor" seated upon, and covering, one half of the epiglottis. The uterus contained three tumors, probably fibrous.

§ II. A case, communicated by M. Aronsohn, supplies a most conclusive example of cancer of this organ. A soft, highly vascular, encephaloid tumor, hard in some points, soft in others, measuring an inch and a quarter in height, by half an inch in breadth, grew from the right side of the base of the epiglottis of a male, aged sixty.§ The presence of this tumor completely prevented depression of the epiglottis, and was doubtless the main cause of the dysphagia under which the patient suffered. But the existence of a similar tumor in connexion with the arytænoid cartilage, and of considerable encephaloid accumulation in both tonsils,

* Element. Illustrations, Carcinoma, Fasc. ii. Pl. ii. fig. 7.

† Reports of Med. Cases, vol. ii. p. 506.

‡ Pathological Observations, p. 14. Lond. 1756.

§ Lobstein, Anat. Pathol. t. i. p. 430. 1829.

renders the precise appropriation of the symptoms to the different parts affected a matter of impossibility.

§ III. I have seen the epiglottis partially destroyed by the extension of cancerous infiltration and ulceration from the pharynx.

SECTION IV.

LARYNX.

§ I. The larynx is but little prone to cancerous disease. Three deaths, it appears, are ascribed in the Paris Registers to affection of this organ.

§ II. Scirrhus and encephaloid have both been observed. Of whatever species, cancer of the larynx is commonly secondary;—when secondary, usually caused by the extension of pre-existing disease from adjacent textures. When the laryngeal formation is primary, it may be the sole evidence of the disease, or co-exist with similar formations elsewhere.

§ III. In Aronsohn's patient, just spoken of, an encephaloid tumor, measuring an inch and a quarter by an inch, of irregularly rounded form, unequally vascular, firm in some places, and very soft in others, grew from the arytænoid cartilage: when depressed, this tumor completely closed the orifice of the larynx. A similar growth sprang from the epiglottis, and both tonsils and the cervical glands had undergone encephaloid infiltration. Dyspnœa, especially severe in the recumbent posture, was the chief symptom: the thorax had undergone flattening, probably from the long protracted inefficiency of inspiration. The total duration of the disease appears to have been about two years.

M. Louis has supplied a very interesting example of primary scirrho-encephaloid of this organ. In a male, aged sixty-eight, dying with extensive vesicular emphysema of the lungs and hypertrophy of the heart, "the epiglottis was somewhat thrown to the left side, but healthy. Immediately underneath it appeared a mass of white, hard, firm matter, creaking when divided with the scalpel, shining, without distinct structure, extending to the right and backwards between the thyroid and cricoid cartilages, not protruding above the superior border of the former, and very little beyond the posterior edge of the arytænoid cartilage, which was itself transformed into similar cancerous matter, without being, at least in its entire extent, continuous with the rest of the diseased formation. The cancerous mass, of a wedge-like shape, measured three quarters

of an inch in thickness posteriorly, somewhat less in front. Of creamy consistence in its interior, it lessened the calibre of the larynx materially on the right side, where the chordæ vocales were destroyed,—a diminution of calibre increased by another similar, but much smaller, mass, placed under the left inferior chorda vocalis, which had not undergone ulceration. The thyroid cartilage was healthy, the cricoid ossified throughout: the arytænoid muscle terminated on the right in the cancerous substance. The mucous membrane of the trachea was pale, and of natural thickness and consistence; the œsophagus healthy." No other organ in the body contained cancerous matter. Nine months before the patient's death the voice was affected without being completely lost; for the last four months, at least, he suffered from permanent aphonia. There was but little cough, but this had a clanging claracter: the patient never complained of pain in the larynx; and upon two occasions only, when some drink escaped through the nostrils, did he suffer from dysphagia. There was no irregularity noticed in the form of the neck; the patient was gay, but emaciated, and the skin of an earthy tint. The existence of the disease does not appear to have been ascertained during life; nor is any attempt made to connect the existence or amount of emphysema present with the laryngeal obstruction.

Albers has contributed well-related accounts of two cases of primary encephaloid disease of this organ. Trousseau narrates another, peculiarly interesting, from the fact of tracheotomy having been performed to avert imminent suffocation. The subject of the operation, a woman, aged thirty-two, continued well for five months after its performance,—the canula being, during this period, retained in the trachea, and the patient enabled, by closing the orifice of the instrument, to speak with very efficient loudness. Nine months after, a tumor, detected at the left inferior part of the larynx at the time of the operation, suddenly acquired a great increase of bulk, and sprouting out between the canula and the upper edge of the wound, soon ulcerated and became the seat of frequent hæmorrhage. Pleurisy with effusion supervened, and the patient died hectic. A multitude of tumors of various sizes, in bunches or isolated, almost filled the larynx, covered the epiglottis and part of the trachea, and, protruding externally, formed a mass as large as a moderate-sized apple; these were of irregular form, and invested with livid, attenuated, and ulcerated skin: numerous similar tumors appeared in the adjoining cellular tissue. The laryngeal mucous membrane between the tumors was ulcerated and fungous; the left

arytænoid ligament converted into the diseased matter; the cartilages, broken into fragments, implanted in the middle of the tumors. The latter creaked under the scalpel when divided, were firm, and of the colour of the substance of an Indian chesnut. They possessed the humidity of encephaloid, though the smoothness and the colour of their divided surface assimilated them more to tubercle. The others were softened, and converted into yellowish pulp. M. Cruveilhier pronounced the growths to be of cancerous nature.

Bibliography.—*Morgagni*, De Sed. et Caus. Morb. Ep. 28, art. 9. (Several carcinomatous? tumors in pharynx and at the top of the larynx.) *Pelletan*, Clin. Chirurg. tom. i. p. 15; 1810. (This was in all probability a fibrous tumor, though described as scirrhous.) *Albers*, Ueber durchbohrende Geschwüre der Speiseröhre und der Luftwegen, in Gräfe und Walther's Journal, Bd. xix. S. 1; 1833. The same in the same, Bd. xxi. S. 527; 1834. *Louis*, in Mém. de la Soc. Méd. d'Observation, tom. i. p. 169; Paris, 1837. *Trousseau et Belloc*, Traité de la Phthisie Laryngée, p. 132; Paris, 1837.

SECTION V.

TRACHEA, BRONCHI, AND BRONCHIAL GLANDS.

§ I. Of primary or even isolated cancer of the trachea, I am unacquainted with any satisfactory example. But there are not a very few recorded cases in which ulceration of this tube, occurring subsequently to infiltration of its walls, has been effected through extension of the disease from the pharynx, œsophagus, and thyroid gland. Such further reference, as appears called for, to the tracheal affection developed under these circumstances will be found in the description of the disease in those organs.

§ II. Cancer of the bronchi, either primary, or existing independently of similar disease in the lungs or either mediastinum, has never, so far as I am aware, been observed.

§ III. The bronchi have under other circumstances exhibited the following modifications of cancerous disease: (1.) In certain cases of infiltration and ulceration of the pulmonary tissue, those morbid processes spread to, and cause the destruction of, the bronchial tubes involved. (2.) Perforation of a bronchus by a portion of actively growing tumor situated about the root of the lung, has occurred in rare instances; the perforating cancer vegetates freely in the interior of the tube into which it has made its way. (3.) More rarely still, a detached tumor (or tumors) forms in connexion with the mucous membrane of a bronchus, the lung being similarly dis-

eased. (4.) Cancerous substance may be found *in transitu* outwards from a softening pulmonary mass. All these forms of disease derive their practical importance from their connexion with cancer of the lungs, and therefore require no further consideration in the present place.

§ IV. The bronchial glands sometimes become cancerous, when the lungs are affected with the disease. It is probable, too, that mediastinal growths may be connected in some cases with these glands. Of the only example of isolated cancer of these structures with which I am acquainted, the University College Collection contains a drawing by Dr. Carswell: the glands were converted into a "spongy, lardaceous substance," tolerably vascular. The mesenteric glands were affected with encephaloid and hæmatoid cancer; all the other organs were free from the disease.

SECTION VI.

LUNGS.

§ I. Although the recency of accurate study of cancer of the lungs would incline us to expect little precise information as to the frequency of the affection, still a few documents are to be found throwing some light upon the point. Thus Herrick and Popp found these organs cancerous six times in one thousand and ninety-one post-mortem examinations of persons dying of all varieties of disease indiscriminately; or once in about one hundred and eighty-two cases. As respects the frequency with which the lungs become cancerous, when compared with other structures, it appears that in sixty-seven cases of cancer, Herrick and Popp found these organs affected with the disease six times, or very nearly once in eleven cases;—a calculation which includes secondary as well as primary pulmonary cancer. Further, the Paris Registers supply a notion of the frequency with which pulmonary cancer, as compared with that developed in other organs, proves the cause of death; in eight of 8289 cases (or about 0·09 per cent.) of cancer of ascertained seat, the fatal event is ascribed to the lungs. The proportional frequency of cancerous and tuberculous disease of the lungs can with difficulty be even guessed at in the present state of knowledge; the only statement illustrative of the point is that of Bayle, who, during the period that nine hundred cases of phthisis came before him, met with three of pulmonary cancer.

§ II. Existing records do not supply materials for deciding the

proportion borne by cases of cancer limited to the lungs, to those in which the implication of the pulmonary substance is merely an element of the diathesis. Andral* not long since taught that the disease is never confined to the lungs,—a statement which even then existing experience showed to be erroneous. Of twenty-seven cases collected by van Kleffens, five furnished examples of limitation of cancer to the lungs; some of a similar kind have more recently been described, of which those of Drs. Maclachlan and G. Burrows are among the most satisfactory.

§ III. Every possible combination of organs has been observed where other parts of the frame, as well as the lungs, are implicated in the disease. Among some of the rarer combinations which have been witnessed, I may adduce those of the lachrymal gland and nares (Bouillaud); the abdominal cellular tissue, pancreas, and left kidney (Davies); the mesenteric glands only (Cless); the right testicle, the verumontanum, and the liver (Andral).

§ IV. When cancer of the lung is solitary, it is of necessity primary; when associated, in the great majority of instances, secondary. Hence it follows, that primary cancer of the lung does not exhibit any very marked tendency to affect the system generally; that the lung, one of the two earliest and most ready recipients of cancer-blastema, circulating secondarily through the frame, is not prone to disseminate its own morbific elements. I have said, in the great majority of instances; but experience would, in respect of visceral cancer, justify a still more absolute statement. I have, in fact, failed to discover more than one case of unquestionable primary cancer of the lung, in which other organs became secondarily implicated: in a case related by Heyfelder, the left testicle and epididymis exhibited the characters of incipient scirrhus. External cancers sometimes appear as secondary formations in the course of the pulmonary disease. In one of Bayle's cases, a soft, fluctuating tumor formed at the acromial end of the clavicle, and was found to contain upwards of ten ounces of fœtid pus. Doubts may be held as to the cancerous nature of this collection; but in a case observed by Drs. Graves and Stokes, three cancerous tumors appeared on the forehead, lower jaw, and lumbar spinous processes. In Heyfelder's case, two tumors formed under the clavicle of the affected side. In Dr. Taylor's patient the affection of the sterno-clavicular joint was probably secondary to that of the lung. Such cases as these are to be distinguished

* Annotations à l'Auscultation de Laennec.

from a different class in which pulmonary, pleural, or mediastinal cancer becomes, from exuberant growth, externally prominent. Processes springing from a pulmonary mass may thus protrude from within the chest, causing displacement, separation, and atrophy of the ribs, with total absorption of the corresponding intercostal and pectoral muscles. Or the original tumor may send ramifications amid, and into the substance of, internal organs, as the heart.

§ V. Cancer of the lung, though not the primary, may become the solitary local, evidence of the disease, in consequence of the ablation of a first-formed growth from some other part, and then acquire all the symptomatic importance of a primary pulmonary affection. Dr. Carswell's drawings (University College Museum) illustrate this fact: a man died from pulmonary cancer; no other organ contained matter of a similar kind, but one testicle had previously been removed for the disease. Lobstein * narrates the case of a woman aged twenty-one, who died of cancer of the lungs about two years and a half after the fore-arm had been amputated for an encephaloid growth from the thumb; she had several attacks of hæmoptysis, and other pulmonary symptoms, previous to her death. This precise course of things is, however, comparatively very rare; though, as need scarcely be mentioned, nothing is more common than development of pulmonary cancers after extirpation of external parts or organs affected with the disease; death is usually rather a consequence under these circumstances of the general diathesis and cachexia, than of the local effects of the pulmonary malady. A case observed by Mr. B. Cooper† exemplifies the assumption of a medium degree of importance by secondary cancer of the lungs, after ablation of the primary disease.

§ VI. Among 58 cases, collected from different sources, 38 were of encephaloid, 9 of scirrhus, 5 of scirrho-encephaloid, 1 of the hæmatoid variety of encephaloid; and in 5 instances the description given leaves the precise characters of the cancerous formation a matter of doubt. In at least 10 of the cases of encephaloid, the disease was secondary. Pulmonary cancer is sometimes tinged with melanic colouring matter: Cruveilhier relates an example of the fact.‡

§ VII. It is a matter of importance practically to determine, whether either lung be materially more prone to cancerous disease

* Anatomie Pathologique, tom. i. p. 432. 1829.

† Med. Chirurg. Trans., vol. xxvii. p. 41. 1844.

‡ Anatomie Pathologique, Livrais. xxii. art. Foie.

than its fellow. In respect of this point, secondary and primary cancer exhibit marked dissimilarity. Secondary cancer almost invariably affects both lungs. Yet there are some few cases on record where one organ only suffered.

In cases where intra-thoracic cancer was primary, and the lungs were affected *ab initio*, or consecutively to deposition in either mediastinum, I find the disease to have been seated in 29 cases in the following manner:

Right lung	13
Left lung	5
Both lungs	3
Right lung and anterior mediastinum	2
Right lung and posterior mediastinum	1
Right lung and both mediastina	3
Left lung and anterior mediastinum	0
Left lung and posterior mediastinum	1
Left lung and both mediastina	0
Both lungs and anterior mediastinum	1
Both lungs and posterior mediastinum	0
Both lungs and both mediastina	0

Hence in 18 of 29 cases, the right lung only suffered; and no doubt can be entertained of the greater proneness of this organ, than of its fellow, to the disease.

Secondary cancer, acquiring in the course of events the importance and influence of the primary disease, commonly occupies both lungs, but may be limited to one of them. A case related by Morgagni illustrates the former, one by Mr. B. Cooper exemplifies the latter, condition.

§ VIII. Secondary cancer commonly exhibits itself in the nodular or tuberous form; more rarely in the guise of stratiform and cupulated sub-pleural patches of variable size; yet more rarely as a large irregular mass; and, least commonly of all, infiltrated through the pulmonary tissue.

Primary cancer of the lung displays itself as an irregular mass in the generality of cases; frequently occurs in the infiltrated form; very rarely assumes the nodular shape (Bayle's case); appears as the sub-pleural stratiform patch, or the supra-pleural nodule; not unusually exists in the infiltrated and irregularly tuberous forms in the same lung; and may exhibit itself (University College Museum) as a series of fringed processes hanging, as it were, from the free border of the organ.

§ IX. Cancers of the nodular form vary in size from that of a pin's head to a walnut or a pigeon's egg, rarely exceeding the latter

dimensions. The shape is rounded or oval, very rarely pyriform; the surface smooth. They are almost invariably found in both lungs, and range in number between some half-dozen to several dozen in each organ. The stratiform sub-pleural patch, flattened and discoid, varies in size from the surface of a split-pea to a half-crown or upwards; occurs sometimes in numbers, coexists frequently with other forms of deposition, and not uncommonly exhibits on its pleural surface radiated superficial indentations, which in very rare specimens coexist with cupulation. Nodules of different sizes arise from the free surface of the pleura in some cases; they are rounded, flattened, or pyriform in shape, and sessile or pedunculated.

The irregularly tuberous form of the disease exhibits itself in masses sometimes of considerable size, but not usually exceeding that of an orange. The surface is usually tuberculated, either from unequal development of the mass itself, or from its spreading in particular directions by infiltration into the adjoining pulmonary tissue. Of such masses there is usually only one; but other forms of the disease may coexist. The weight of a lung thus affected has been found five (Cless) and six (Graves and Stokes) pounds. In Lobstein's case both lungs together weighed nine pounds.

Where the mass of the organ is increased, the affected lung protrudes beyond the middle line, and, extending from the right side, may cover the pericardium, large vessels, and trachea. But this state of things is most common, when the new substance is more or less completely extra-pulmonary; when a small mass only exists, and lies outside the proper tissue of the lung, and when infiltration of the latter coexists, reduced bulk of the organ is the effect produced. Detrusion of the mediastinum to the opposite side may coexist with such reduction of bulk.

§ X. Infiltrated cancer occurs under two very distinct aspects. In one of these all trace of pulmonary tissue has disappeared in the diseased parts; yet the mode of deposition is clearly shown by the preservation of the lobular character of the affected organ: this variety of infiltration is admirably depicted in Dr. Carswell's Fasciculi. Here the condition of the tissue, while actually undergoing the infiltrating process, cannot be inferred: but a case, which occurred under Dr. Taylor's care in University College Hospital, supplied a satisfactory specimen of the diseased process while yet in an incipient stage. The colour of the affected lung was altered materially in some parts, probably by commencing gangrene; but when the new matter was clearly infiltrated inde-

pendently of other change, a pinkish and somewhat transparent aspect struck the observer, vessels became apparent on closer scrutiny, and I discovered spherical and caudate cells (both nucleated) in the fluid expressible from the parts exhibiting these appearances. This fluid was opaline and creamy, although the stroma containing it looked semi-transparent. The pulmonary substance thus affected was friable, yet slightly crisp. There was an encephaloid mass of some bulk at the root of the lung, and cancerous accumulation in other parts of the body.

§ XI. Cancerous nodules lie commonly in immediate contact with the pulmonary substance: they are sometimes cut off from it by a coating of condensed cellular membrane, a condition of things still more rare in the case of the irregular tuberous mass. A true cyst has not been discovered in connection with pulmonary cancer; but the term "encysted" has been applied by writers to tumors invested in the manner just referred to. All varieties of consistence of the cancerous substance exhibit themselves.

§ XII. All parts of the lung are liable to become the seat of cancerous formation; but it is remarkable that the different forms of the disease affect a preference for certain particular localities. Thus the disseminated nodular mass (the favourite type of secondary deposition) occurs scattered through the lung generally, exhibiting a special tendency, however, (p. 98,) to accumulate in the vicinity of the pleura. The irregular tuberous mass commonly usurps the place of the middle lobe of the right lung; whence infiltration extends in the majority of cases. Infiltration may, however, proceed from the apex towards the base, as shown in two cases referred to by M. Bouillaud, and in one of the patients examined by Dr. Hughes; or it may proceed from the base towards the apex: these facts have their diagnostic bearing, as also has the tendency of the tuberous mass to form in the vicinity of the root of the lung and chief bronchus.

§ XIII. The ultimate elements of the lung affected have not been determined by direct examination. There can be no temerity in assigning the intervascular interstices of the lobules as the main seat of formation; whether tuberiform or infiltrated. The secondary nodule originates doubtless in stagnation occurring in the ultimate radicles of the pulmonary vein.

§ XIV. The intrinsic progress of the disease in the lung does not essentially differ from that observed elsewhere. Softening, conversion into creamy pulp, with or without evidences of common sphacelus, elimination of the broken-up materials through the

bronchi (Canstatt, Davies), and formation of excavation, all pursue their usual course; but peculiar circumstances may render the detection of these phenomena during life more difficult than might on first consideration appear. The formation of excavation, small or large, single or numerous, has been noticed after death by at least the following observers; Bayle (two cases), Lobstein, Davies, Perrier, Heyfelder, Canstatt, Hughes, Taylor, Stokes, Maclachlan, Greene.

§ XV. The morbid changes occurring in pulmonary cancer are such as arise in the same substance elsewhere produced. Deposition of saline matter has been witnessed (calcareous concretions by Cless); and melanic colouring matter, we have seen, is sometimes thrown out. Interstitial hæmorrhage occurs in the meshes of the new growth sometimes, and infiltrates the mass with blood; this is extremely rare however: it is more common to find an accumulation of grumous coagula or of fibrinous coagula and serosity in some particular part of the mass. Thus, doubtless, originate the small cysts filled with serous fluid which have sometimes been found in pulmonary growths.

§ XVI. The nodular form of the disease rarely produces any effect on the pulmonary tissue, except detrusion with or without condensation, or, on the contrary, atrophous rarefaction; the rude appearances of health are consequently preserved. In cases of tumors of large size, which detrude the tissue of the lung, simple condensation of the latter is of course induced. Pneumonic consolidation is rare; it sometimes occurs, however. Gangrene of a portion of the lung may be induced; Dr. Stokes, who has observed a case of the kind, traces the occurrence to pressure of the new growth upon the main bronchus, in as much as it has been shown by Dr. Mac Donnell that such pressure must act upon the nutritive arteries of the lung. Dr. Carswell (University College Museum) has given a striking representation of diffuse pulmonary apoplexy, supervening around an encephaloid tumor, the vessels of which had given way. And the remarkable case, recorded by Lobstein, shows that the rarest and final anatomical effect of pulmonary hæmorrhage may take place in connexion with cancer of the lung: there was here in truth a quantity of blood effused into the pleural sac through a rupture three inches long of the upper lobe, communicating with a cavity filled with coagulated blood and encephaloid matter.

In no case have pulmonary tubercles (I mean, those characteristic of phthisis) been found in any form or stage of progress (see p. 185).

The ultimate branches of the pulmonary artery and vein are sometimes obliterated through extreme compression. In a case observed by Heyfelder, the pulmonary artery and veins were obliterated from the heart onwards, and converted into ligamentous cords. Whether in such cases a new circulating system is established around the affected parts, as has been proved by van der Kolk and Guillot to arise, in lieu of the original vessels, in cases of pulmonary tuberculization, is yet matter for inquiry. The trunk and larger branches of the pulmonary vein not very unfrequently contain masses filling more or less completely the calibre of the vessel, and consisting of intermingled fibrine and cancerous matter,—the latter sometimes predominating to such extent, as to give the whole the aspect of pure encephaloid. The same condition is, though less commonly, witnessed sometimes in the pulmonary artery. The main trunk of either vessel may be simply compressed by the new mass.

The superior vena cava may undergo simple pressure diminishing its calibre; it may be elongated by the growth of the mass, and where passing through this may undergo absorption, so that the blood shall appear to circulate through a channel of encephaloid. It may also contain medullary substance. In the woman observed by Lobstein, the vessel contained a nodule, as large as a nut, protruding into its interior, and covered with a thin pellicle. In a case observed by Dr. Sims, the subclavian vein of the affected (right) side was filled with layers of solid fibrine. I have lately seen the jugular veins dilated to three times their natural size.

§ XVII. The bronchi undergo compression, but continue permeable, though of reduced calibre, or in some cases undergo complete obliteration; or they may be partially destroyed by the progress of ulceration from the morbid formation; or perforated by a portion of the latter, which subsequently vegetates in their interior; or they may themselves, independently of the pulmonary disease as regards continuity, give origin to nodules of cancerous matter. When a chief bronchus passes through the morbid mass, and is consequently more or less obstructed, dilatation may take place above the obstruction: one of Dr. Sims's cases illustrates this fact, which is in accordance with the general law of production of dilatation in tubes.

The conditions of the texture of the mucous membrane of the bronchi generally of the affected lung has scarcely been noticed. Redness has been mentioned in one or two instances, independently of softening and excavation. The trachea underwent pressure in

one of Dr. Sims's cases, sufficient to flatten the musculo-membranous part, and widen the arch of the cartilages. The bronchial glands have been in some cases noted as distinctly healthy; in the majority of reports no mention is made of them; in a certain number they were found simply enlarged (Lobstein, Canstatt, Hughes); in one (Sims) flattened out by pressure:—they may become cancerous.

When the condition of the pleura is mentioned by the narrators of cases, some unhealthy condition of this membrane is invariably described. The most common appearance is that of long-standing adhesions; recent soft pseudo-membranous matter without liquid effusion has sometimes been observed; close and general adhesion of the pleura; simple hydrothorax; empyema; and hæmothorax. In a singular case observed by Dr. Stokes "the pleural cavity was found completely obliterated, but through the serous membrane the lung could be seen, not collapsed, apparently solid, and of a yellowish-white colour. . . . . A large portion of the lung was burrowed by anfractuous excavations, communicating on the one hand with the bronchial tubes, and on the other terminating in fistulæ, running in various directions to the surface of the lung, where they terminated in superficial cavities, containing air and a whitish purulent fluid, bounded on the one hand by the posterior surface of the pulmonary pleura, and on the other by the degenerated pulmonary substance. This dissection of the pleura from the lung extended over almost the lower two-thirds of the organ."

§ XVIII. Detrusion of the œsophagus to the side opposite the disease has occasionally been noticed. In a remarkable case observed by De Haen and Schwenkius,* the detrusion was so marked, and the consequent obstruction to deglutition so great, that the ingesta habitually accumulated above the obstruction, and had given rise to considerable dilatation of the tube.

§ XIX. I have succeeded in finding but thirteen cases in which the non-cancerous lung (one organ only being so affected) is described with any degree of precision. In nine of these the organ is said, unconditionally, to have been healthy; in one the parenchyma appeared saturated with blood; in one there was slight emphysema; in a third considerable emphysema and red hepatization; and in a fourth a section of the pulmonary tissue "exhibited a slightly whitish appearance, which, in all probability, was the commencement of a similar disorganization to that which existed in the other

* Related by Van Swieten, Comment. in Boerhaave Aphorism. tom. ii. § 797, p. 650. Ed. 4to. Taurini, 1747.

lung." (Stokes.) In this case the comparatively unaffected lung was compressed and detruded outwards and upwards by the diseased mass. In no single instance has tuberculous matter been found in the non-cancerous lung. The bronchi were inflamed in one case. The pleura was the seat of old adhesion in two cases; of hydrothorax in two; of pleurisy with effusion in one.

§ XX. Lateral detrusion of the heart has been noticed in some cases; in one of these the right auricle had undergone flattening. In two instances the heart was pallid and atrophous. The pericardium contained an unnatural quantity of serum in several cases; "much turbid yellowish fluid" in one (Morgagni); four ounces in a second; eight ounces in another. In one of Dr. Sims's patients the pericardium was much dilated at the base from several large tumors being developed within it; the pulmonary tumor pressed upon and sent a small process into the dilated cavity of the right auricle; the tumor had freely vegetated in the left auricle also, the substance of which was absorbed to a considerable extent. The calibre of the aorta was diminished.

§ XXI. In ten of sixteen cases the abdominal and cranial organs (setting aside cancerous disease) were either perfectly healthy, or exhibited very insignificant deviation from the natural state. In the remaining four the following conditions existed: in one, an abdominal tumor pressing on the ductus choledochus; in a second, softening of the brain and cerebellum; in a third, opacity of the arachnoid with effusion, turgidity of the vessels of the pia mater, a softened state of the entire encephalon, softening of the mesenteric glands, and mucous membrane of the stomach and small intestine; incipient scirrhus of the left testicle and epididymis; in a fourth the liver had undergone the "nutmeg" alteration, and presented one patch of encephaloid, the gall-bladder contained calculi, the kidneys and right supra-renal capsule were cancerous, the uterus, near the os tincæ, the seat of three pea-like scirrhous tubercles, an axillary gland cancerous. One of Dr. Sims's patients had encephaloid tumors of the uterus and ascites; in Dr. Sims's other case the arachnoid was opaque, considerable effusion existed under it, and the liver exhibited the "nutmeg" change.

Existing cases of pulmonary cancer, so far as they afford available evidence, lend additional confirmation to the law pointed out by M. Louis, that ulcerations of the small intestine, especially of the ileum, are peculiar, *among chronic affections*, to phthisis and syphilis. In Heyfelder's case, the complete absence of ulceration is distinctly noted. This fact is practically significant.

§ XXII. The growth of cancer of the lung is not limited to any particular period of life; I find the ages of 44 persons cut off by the disease to have been as follows:

Age.	Cases.	Age.	Cases.
0 to 10	0	40 to 50	9
10 „ 20	3	50 „ 60	11
20 „ 30	8	60 „ 70	5
30 „ 40	7	70 „ 80	1

In 44 cases the male sex suffered 25 times, the female 19. The general law of frequency of cancer in the two sexes consequently appears to be infringed by the pulmonary disease. The number of cases is, however, too small to furnish more than a provisional result.

§ XXIII. I have been able to discover but ten cases from which the duration of the disease can be calculated with any approach to accuracy. It is to be understood that the apparent duration (from the first supervention of symptoms), and not the real duration, is attempted to be provisionally fixed in the following statement: mean duration = 13·2 months; greatest = 27·0 months; least = 3·5 months.

§ XXIV. In considering the *symptoms* of cancerous disease of the lung, a distinction is to be made *in limine* between cases in which the morbid product appears in the nodular form of secondary type, and those wherein the new substance, of primary type, infiltrates, or forms irregular tuberous masses in, the parenchyma of the lung.

(A.) The disseminated nodular form of cancer, even when the nodules are very numerous, commonly gives rise to no symptoms,—nor do the nodules alter perceptibly (so far as experience goes) either the resonance of the chest, or the properties of the respiratory murmurs. The affection is therefore functionally and physically latent.

In some cases, however, dyspnœa has been observed; in one instance so marked was this symptom, that amputation of the fore-arm was deferred in consequence (Bayle). The patient died suffocated on the twentieth day after the operation. This symptom is, so far as I can ascertain, the only direct functional change which has been known to depend upon the presence of these nodules: it arises from simple mechanical interference with respiration.

Dr. Stokes states, that, in two cases observed in Ireland, bronchitis (recurring frequently, and upon each occasion with greater

severity, until eventually it became an established chronic state, and proved the cause of death) was noticed.

In one case, where the nodular form of the disease was primary, cough and mucous expectoration, becoming abundant, jelly-like and bloody, and eventually purulent, were observed. Violent thoracic pain was occasionally complained of, especially on the right side; fever set in, and the sputa consisted of pus and milky-looking flocculi: the majority of these symptoms became less severe subsequently, recurring again with debility and emaciation. The patient sank, death being hastened by acute plastic pleurisy. In addition to the effects of this inflammation, the post-mortem examination disclosed six white, round, vascularized, cancerous nodules, as large as acorns, (the intervening pulmonary tissue being scarcely harder than natural,) in the left lung, and a greater number in the right. Some of the tumors were soft and milky, others actually broken down and converted into ulcerated cavities (Bayle). There can be no question that in such a case auscultation would detect the signs of excavation; while the expectoration of encephaloid substance might render the nature of the cavity obvious.

(B.) Even the primary type of the disease may run an almost latent course under peculiar circumstances; but this is infinitely rare.

Pain appears to be among the most invariable symptoms of the affection; Canstatt's case is the only one I have found, in which it was unquestionably absent. In Dr. Taylor's patient, violent pain attended an acute pulmonary attack, subsequently disappeared, and returned occasionally towards the close of life. Narratives of cases leave the reader in doubt as to the time of origin of pain: it has occasionally been the first symptom noticed, but this is rare. The character of the pain varies: sometimes slight, sometimes severe; shooting or dragging, and compared in one case to electric darts passing from the shoulder to the false ribs, and from the sternum to the spine; in several instances extending to the shoulder of the affected side; in a very few limited to the sternal and interscapular regions. Commonly intermittent, or remittent, the pain is in a very few instances described as constant. Pain of a continued kind is enumerated by Dr. Stokes among the important diagnostic symptoms of the affection; but the analysis of recorded cases does not warrant so high an estimate of its significance. The influence of pressure on the pain has not been investigated; but soreness of the integuments, or even extreme tenderness, has been occasionally noticed. The immediate seat of pain is obviously the pleura

in the greater number of instances; but the cancerous substance and implicated pulmonary tissues may in some cases be its real source.* It is also likely to depend in some instances on intercostal neuralgia.

Dyspnœa is among the most constant effects of the disease; and has in some patients taken the lead, both in point of time and severity, of all others. In some cases paroxysmal, in others it has proved a permanent source of suffering, gradually increasing in violence. Rarely intense, it has sometimes given rise to the keenest anguish; as in a patient recently under my care in the Hospital for Consumption: but in such cases the mediastina are greatly encroached upon. Dr. Taylor's case shows that the breathing may continue easy, until the last fortnight or so of existence.

Cough is mentioned among the symptoms in every moderately well recorded case. It is either occasional or frequent, simple or paroxysmal. Cough may absent itself, more less completely, for variable periods during the course of the disease.

In one of Dr. Sims's cases the cough is distinctly affirmed to have been dry; in Heyfelder's very satisfactory narrative the statement that the cough was dry is more than once repeated. These are the only instances of the kind (where the disease was primary) I have met with. In not a few cases the expectoration appears to have been trifling in quantity; and in some (*e. g.* Maclachlan's) did not commence till almost the close of life.

The expectorated matter varies in quality. It may be simply mucous or catarrhal, or purulent or bloody. In the latter case, the blood seems mixed thoroughly with serosity, mucus, or mucopus; and the sputa, thus composed, are opaque and commonly perfectly free from viscidity, though they may be somewhat glairy. The colour of such sputa varies: it may be that of red currant jelly, of black currant jelly, or pink. Encephaloid matter has sometimes been expectorated; cases observed by Bayle, Davies, and Canstatt, furnish most distinct examples of the fact,—in the two former the physical characters of the product were distinguishable. In a case observed by Dr. Greene "caseous" matter was expectorated during life.

* It is true, I have never seen a case of pneumonia attended with acute pain, where evidence did not exist of implication of the pleura; nor does the experience of accurate observers, generally, contravene my own. But M. Grisolle (De la Pneumonie, p. 204; Paris, 1841,) has made it certain, by the post-mortem examination of one individual, that acute pain may by possibility originate in inflamed parenchyma.

In two cases (Stokes, Canstatt) the sputa are stated to have been peculiarly fœtid from the influence of gangrene; the breath was so in Dr. Taylor's patient. Such fœtor is not an invariable symptom; for, though it may often have existed, where no mention is made of the circumstance, its absence is in one instance at least (Heyfelder) distinctly averred. In one case (Davies) the expectorated substance had a sweet and nauseous taste.

I find nine cases at least in which *hæmoptysis* formed a more or less prominent symptom. In some of these (Davies, Taylor), it appears to have been noted but once or twice; in others (Sims, Lobstein, Stokes, Canstatt,) it recurred frequently and copiously. An individual observed by Bayle had slight hæmoptysis continuing for seventeen days consecutively. Canstatt's patient, admitted on account of hæmorrhage from the lungs, had a severe attack almost daily during his three weeks' sojourn in the Hospital previous to his death. I am without the means of fixing the period of the disease at which hæmoptysis first appears; it has in some cases, however, been a very early symptom. The earliest attacks are sometimes more violent, than any that follow.

The amount of frequency of this symptom being a point of deep interest to determine, I have analysed all the cases I have found related with sufficient closeness to be trustworthy. These cases are only nineteen in number; in all the disease was primary, and exhibited the characters of infiltration, or of the simpler tuberous mass: the results were as follow:

	19 Cases of Cancer.
Cases of Hæmoptysis	10
„ of bloody expectoration without hæmoptysis .	4
„ of total absence of bloody expectoration . .	5

Hence it follows that $\frac{1}{2}$ of persons affected with cancer of the lung have actual hæmoptysis; and that less than $\frac{1}{3}$ of the whole number remain free from some slight discharge of blood.

Of these eighteen cases the distribution in respect of sex was as follows:

		Number affected with Hæmoptysis.
Males . . .	13	5
Females . . .	6	5

Hence, while $\frac{5}{6}$ of females, only $\frac{1}{3}$ of males, suffer from this symptom.

In four of these cases the source of the hæmorrhage was evidently the vessels of the broken-down cancerous mass, or of the pulmonary surface exposed by the decay and elimination of this. In Dr.

Sims's case (that in which the remarkable condition of the heart already referred to existed) and in one of my own, exhalation from obstructed circulation appears to have been the cause of the hæmorrhage; in Dr. Stokes's patient, gangrene of a portion of the lung (but doubtless connected with breaking-down of cancerous substance also) gave origin to the flow of blood.

The *decumbency* is most commonly on the back, with slight inclination to the affected side (diagonal); some patients, however, lie constantly on the affected side; others are enabled to bear any position but upon the back; orthopnœa exists in some cases towards the close. I find no instance in which the patient habitually lay upon the affected side; but in a patient of my own, who improved greatly, though temporarily, while in hospital, the ability to lie on the sound side was the first change announcing the improvement.

Among the most important symptoms of intra-thoracic cancer are those of (*a.*) *centripetal* and (*b.*) *centrifugal pressure.* These symptoms, though much more commonly produced, when of great amount at least, by mediastinal growths, still may be caused by cancer limited to the proper substance and root of the lung.

(*a.*) *Dysphagia* from pressure on the œsophagus has been met with in some cases of pure infiltration (*e. g.* those of van Swieten and Graves): the sense of constriction is generally referred by the patient to the lower part of the neck.

Pressure on the large venous trunks, combined, as has been seen, in some cases with obstruction of their cavity by fibrine or cancer, gives rise to distension and stagnation of the contents of the superficial veins. The jugular, the subclavian, the axillary, the mammary, the superior epigastric, and the veins of the face and forehead, are unusually large and full. The deep-seated vessels are similarly affected, a fact shown by general tumidness of the neck and face (felt even by the patient), prominence and staring expression of the eyeballs, and lividity of the surface. Passive serous transudation is likewise thus induced; and œdema of the affected side (sometimes highly developed), of the corresponding arm, and of the face, follow as necessary consequences. I have recently found the radial pulse very triflingly weaker and smaller on the affected (right), than on the other side; but in this case a mediastinal tumor coexisted with the disease affecting the root of the lung; the difference has been observed independently of the former, and is, under all circumstances, rare.

Pressure on the trachea gives rise to stridulous respiration, weak-

ness of the voice, and very characteristic labour in speaking. This affection of the voice may exist without that of the respiration, or *vice versâ*. Pressure of the bronchi prevents the entry of air into the lung, to a degree varying with its amount. Detrusion of the mediastinum, and lateral and downward detrusion of the heart, are among the further effects of compression. I have seen the heart beat directly under the left axilla.

(*b.*) The absence or presence of changes in the walls of the thorax, produced by pressure from within, establishes an important classification symptomatically of intra-thoracic cancers: Dr. Stokes first drew attention to this fact. And the symptomatic, answers to an anatomical, distinction: pure infiltrated cancer, instead of causing pressure outwards, is productive of contraction; infiltration combined with tuberous formation in the lung itself will induce expansion proportional to the amount of the latter.

§ XXV. The *physical signs* of cancer of the lung are among the most satisfactory and distinctive induced by any pulmonary affection. The two forms of the disease just referred to produce, as might be anticipated, very different physical results, and therefore require to be carefully distinguished. In order to make this distinction the more clear, I shall place the two series of signs in juxta-position, and then add such comments as appear requisite.*

PHYSICAL SIGNS OF CANCER OF THE LUNG.

(a.) Simple cancerous infiltration, or infiltration associated with limited tuberous formation, the latter especially seated towards the root of the lung.	*(b.) Cancer of the lung mainly tuberous, but, it may be, associated with infiltration to a limited extent.*
INSPECTION.	
Retraction or depression of the affected side, with more or less marked deepening of the intercostal spaces; diminished motions of expansion and of elevation; diminished costal motions.	Diseased side expanded generally, but not with perfect uniformity, or bulged inferiorly; intercostal spaces widened, flat, or even slightly fuller than natural; motions, both general and costal, completely abolished; fluctuation imperceptible in intercostal spaces.
APPLICATION OF THE HAND.	
Vocal and tussive fremitus diminished in intensity; impulse of heart distinctly perceptible over the anterior surface of implicated side in some rare cases.	Surface unnaturally smooth and even; vocal and tussive fremitus completely deficient; neither simple nor peripheric fluctuation; double pulsation sometimes transmitted from the heart.

* I here follow the account of the signs I have elsewhere given: "Physical Diagnosis of Diseases of the Lungs," p. 140.

MENSURATION.

Semicircular measurement natural or diminished; deficient increase of width during inspiration.	Semicircular measurement of the side natural or increased; width of side unaltered by inspiration; antero-posterior diameter increased; vertical measurement increased in cases of very extensive formation; distance between the nipple and the median line greater than on the opposite side.

SITUATION OF SURROUNDING PARTS.

Mediastinum may be detruded towards the opposite side; the heart may be similarly displaced laterally or downwards; the diaphragm and infra-jacent viscera are not depressed.	Heart and mediastinum detruded laterally; corresponding division of the diaphragm with the infra-jacent viscera more or less depressed.

PERCUSSION.

Sound intensely dull, and of short duration; resistance of walls strongly marked; special character of sound tubular in some cases about the lower border of the infra-clavicular region; the dulness of sound sometimes extends beyond the middle line.	Sound completely and extensively dull, and of short duration; resistance of walls extreme; limits of the dull sound not altered by changing the position of the patient.

[*Before softening of the cancerous matter.*]

AUSCULTATION.

Strongly marked diffused blowing respiration, or with the progress of the disease (in consequence of accidental obstruction or obliteration of a chief bronchus) respiration weak or almost suppressed,—retaining, as long as it continues audible, the bronchial or blowing special character; bronchophony; bronchial cough; heart's sounds audible with undue intensity over the affected part.	Diffused or tubular blowing respiration, intensely developed in some cases; rhonchi either absent or those of coexisting bronchitis; bronchophony; bronchial cough; heart's sounds audible with undue clearness; double blowing murmur in very rare instances accompanying the cardiac pulsation above mentioned.

[*After softening and elimination of cancerous matter.*]

PERCUSSION.

Sound may become somewhat clearer; acquiring at the same time more distinctly the tubular, almost amphoric, special character; the resistance of the walls may proportionally diminish.	

AUSCULTATION.

Cavernous respiration; mucous, cavernulous or cavernous rhonchus.	

The diminution in intensity of vocal fremitus above set down has been noted in the majority of cases in which the sign is spoken of. In one instance an increased amount of vibration is affirmed to have been present. But the disease was here, as usual, on the right side, and the natural excess of vibration on that side may have given rise to the idea of augmented intensity.* When the vibration is distinctly less marked on the right than the left side, the sign is of some value.

The distinct transmission of the double cardiac impulse over the surface corresponding to the affected lung, has only been noticed in two cases (Sims, Stokes). In both, the pulmonary diseased mass came in contact with the pericardium, and was more or less firmly attached to the great vessels at the base of the heart. The mode of production of the sign would thus appear readily intelligible; but *per contra* in the remarkable case observed by Dr. Sims (subsequently to that just referred to), wherein pulmonary cancer actually became continuous with, and protruded into the heart, no such pulsation is made mention of. A patient, recently under my care, (labouring under accumulation at the root of the right lung and in both mediastina,) was conscious of a double pulsation in the right mammary region, though the heart beat in the left axilla almost. I found it unaccompanied with sound, and suggesting the idea of an inward succussion. In this case the special character of the percussion-note became *amphoric* all over the lower half of the right side of the *back*.

The gradual diminution of force, and retention of the bronchial character, in the respiratory murmurs, so long as these remain at all audible, are worthy of particular note. The special character may, as I have lately observed, be tubular or even amphoric with perfect dryness. This state of respiration exists quite independently of cavity; and, on the other hand, it would follow from Dr. Maclachlan's case, that, when a cavity exists, its signs may be prevented from being evolved, in consequence of non-admission of air, from pressure on the bronchi.

The unaffected lung is the seat of exaggerated respiration; and the percussion-sound of the corresponding side may be fuller and clearer than natural.

§ XXVI. When the cancerous disease is limited to the lungs, and when no serious malady of other organs coexists, the general

* This excess of vocal parietal vibration all over the right division of the chest is one of the most invariable physical characteristics of the natural state. I make this statement after long-continued attention to the point.

symptoms have rarely been of severe character. Laennec specially refers to the slowness with which emaciation sets in; and states, that, in all cases of pulmonary encephaloid disease met with by himself, death was caused by suffocation or otherwise, long before the period, when anything like wasting could have been produced. Numerous cases, among those more recently published, confirm the general truth of this statement; but when loss of flesh once commences, emaciation rapidly advances, and it has in some rare instances set in at an early period; the same may be said of failure of strength. Night perspirations, as I have myself seen, sometimes become profuse. In the uncomplicated disease, febrile action is rarely intense; the characters of the pulse vary too much to admit of general description,—its frequency is commonly above the average. Dr. G. Burrows found the difference between the frequency of the pulse in the recumbent and sitting postures so much as 28 (132 and 160). When the condition of the skin is mentioned by writers, it has almost invariably exhibited some shade of the cancerous tint;—waxy-yellow, straw-coloured, or greenish-yellow. Lividity of the face and neck is the mere result of mechanical venous obstruction, and not to be confounded with altered hue dependent on the *nature* of the disease.

§ XXVII. Persons having pulmonary cancer are sometimes, but rarely, cut off by intercurrent disease of some other organ. As we have seen, they rarely succumb with symptoms assimilable to those of phthisis; increasing dyspnœa, leading to orthopnœa, and attended sometimes with anasarca of the lower extremities, generally proves the immediate cause of the fatal event. Obstruction of the pulmonary artery or arteries may probably have been the cause of the *sudden* death, which has been noted in a few cases, where external cancer has been removed. I think this the most probable explanation of the fact in two cases referred to by Dr. Stokes* and Mr. Paget.†

§ XXVIII. I. Primary cancer of the lung may be confounded with other thoracic affections, according as it predominates in the infiltrated or in the tuberous forms.

(A.) *Infiltrated cancer* will be distinguished from (1.) *pneumonic consolidation* by: α. The flattening or retraction of the affected side; for, though such alteration of shape may occur during the resolution of simple pneumonia,‡ it never will do so to the extent observed in cancer, nor will it ever coexist with hepatisation so

* Dub. Journ., xxi. p. 213. † Med. Chir. Trans., vol. xxvii. p. 167.

‡ Vid. Physical Diagnosis of Diseases of the Lungs, p. 216, § 127.

extensive, as would be required to give rise to the extensive dulness and blowing respiration met with in cancerous infiltration; β. The total absence of crepitant rhonchus before softening, and the large mucous rhonchus present after that change has occurred,—a rhonchus not to be confounded with that attributed by some observers to the suppurative state of pneumonia; γ. In some cases, the extension of dull percussion-sound beyond the median line; δ. The absence of the rusty sputa of pneumonia;* ε. The absence of inflammatory fever, the deficiency of signs of acute disease, and history of the case generally; ζ. The signs (if present) of centripetal pressure, none of which ever occur in pneumonia.—(2.) From tuberculous consolidation (*previously to softening of the cancerous matter*) by: α. The signs of extensive consolidation being unattended with rhonchus of any kind; β. The absence of disease in the other lung,—a state frequent in cancerous, of infinite rarity in tuberculous, disease; γ. The effects of centripetal pressure; δ. The peculiar characters of the expectoration; ε. Hæmoptysis † occurs in both diseases, but if very copious discharge of blood take place, the inference is in favour of its tuberculous origin, from the mere fact that pulmonary tubercles may be considered to be about three hundred times more frequent than pulmonary cancer; η. The gradual suppression of respiratory murmurs; ζ. The less severity of the general symptoms in cancerous disease. (*Subsequently to softening of the cancerous matter.*) The same points of distinction are available, as previous to this occurrence, except the first.—(3.) From *pleurisy of old standing with solid false membrane in the pleura*, cancer will be distinguished by: α. The absence of deepening of the intercostal spaces, some of which would be narrowed

* Although the "rusty sputum" is invaluable (when it occurs) as an evidence of pneumonia, the diagnosis must be repeatedly made without its aid. The sputa much less frequently present this tint, than is commonly supposed.

† The researches of M. Louis have made the diagnostic importance of hæmoptysis in phthisis sufficiently evident; this discharge occurred to a slight or to a great amount in "two-thirds" (in point of fact only 66 per cent.) of the consumptive patients observed by him. But I have above shown (p. 351) that hæmoptysis, or bloody expectoration, is of still more common occurrence (in 72 per cent. of the cases) in cancerous disease of the lung; and the excess of frequency of hæmorrhage belonging to M. Louis's variety "copious" is still more markedly on the side of cancer; for such hæmorrhage occurred in scarcely 29 per cent. of consumptive sufferers, but in 50 per cent. of cancerous patients. Whence it clearly follows that the importance of hæmoptysis as a sign of tuberculization is not *absolute*, but *relative*, and arises from the fact that, though another pulmonary affection is still more prone to induce such hæmorrhage, that affection is vastly less common than itself.

and obliterated in such pleurisy; β. The absence of procidentia of the shoulder, tilting outwards of the scapula, or curvature of the spine; γ. The greater dulness of the percussion-sound, and greater amount of resistance of the parietes; δ. The extent and intensity of the bronchial or blowing respiration; ε. The invariable absence of friction-sound, which is sometimes (redux) present in this stage of pleurisy; ζ. The occasional existence of dull percussion-sound beyond the median line in cancer; η. The presence of signs of internal pressure; ϑ. The peculiar expectoration; ι. The general history of the cases, indicating in the one instance an affection of increasing severity, in the other a disease subsiding. If *dilatation of the bronchi* coexist with retraction of the side after pleurisy, and if the bronchi be the seat of irritation and active secretion, while the constitution generally becomes implicated, the case will be less easily distinguished from cancer. But many of the points of distinction enumerated will still avail; hæmoptysis will probably have occurred to aid in the solution of the difficulty; and the signs of bronchitis will not be limited to the lung containing the dilated tubes.

(B.) *Tuberous cancer with dilatation of the side* will be distinguished from *extensive pleuritic effusion* by: α. The invariable absence of simple fluctuation in the pleura; and in all probability, even in cases of the most diffluent encephaloid, of peripheric fluctuation; β. The intensely marked resistance of the thoracic walls under percussion; γ. The intensity of the blowing respiration, and the great extent of the surface over which it is audible; δ. The intense bronchophony commonly discovered; ε. The unnatural distinctness of transmission of the heart's sounds; ζ. Occasionally the existence of transmitted pulsation in the cancerous lung; η. The comparative irregularity of surface of the expanded side; ϑ. The existence of a greater or less number of signs of centripetal pressure; ι. Hæmoptysis, if this have occurred; κ. The peculiar expectoration.—From *aneurism of the arch of the aorta* (with which the disease presents many characters in common, such as local prominence of the thoracic walls, dulness of percussion-sound, enfeebled respiratory murmurs, signs of venous obstruction, alteration of voice, dysphagia, dyspnœa, and sense of fulness and weight in the chest) cancerous tumor may be distinguished, when of very large size and causing extensive dulness of percussion-sound in front and behind, by the mere fact of these large dimensions; when of smaller size, by the total absence, or the slight amount, of pulsation and of murmur (either in front or in the back) such as that produced in aneurism, and by the absence of impulse, and also of

thrill in the hollow above the sternum, and above the clavicles generally. Difference in the radial pulses is a sign not distinctive, for it is absent frequently in aneurism, and, as a case I relate further on shows, may be present in cancer. Detrusion of the heart, if it exist, is valuable as an evidence of the latter disease.

The association of other affections of the lung will of course increase the difficulty of diagnosis. If empyema occur after the diagnosis of cancer has been made, it will give rise to less difficulty than under other circumstances; the rapid enlargement of the side, together with great increase of dyspnœa, and of the œdema of the walls of the chest, &c., possibly the occurrence of ægophony, and other signs of pleuritic effusion, will establish the point. Presuming that a case occurs in which, when first seen, the two diseases have already been developed, and of which we have no history but such as may be extracted from the patient, the diagnosis must be founded upon the existence of signs of internal pressure, of the peculiar bloody sputa, or of actual hæmoptysis (the opposite lung being healthy), coexisting with those of empyema. Should we be enabled to follow the progress of the case, and, while the empyema is proved by mensuration to diminish, we observe the signs of internal pressure and of pulmonary distress to increase or even remain stationary (as in the interesting case successfully diagnosticated by Dr. Stokes) the coexistence of the two diseases may be pronounced a matter of certainty.

The occurrence of hæmothorax (as in Lobstein's case) is probably not to be diagnosticated. The same remark may be made more decisively in respect of the remarkable condition, observed by Dr. Stokes, of effusion of air between the pulmonary pleura and parenchyma of the lung.

II. Secondary cancer of the lung, in its special disseminated nodular form, is beyond the reach of *positive* diagnosis. Dr. Stokes (admitting, however, his want of experience on the point) considers himself "safe in stating, that if, with the symptoms and signs of bronchitis, we find the chest to become dull; if this dulness be extensive, yet incomplete, the stethoscope showing that the lung is still permeable, the solidity only occurring in points,—we may make the diagnosis either of acute tubercle or of this form of cancer; and, as the symptoms of acute phthisis are generally strikingly marked, there would be probably no difficulty in determining on the nature of the affection." But, even upon Dr. Stokes's own showing, such bronchitis is excessively rare; and the peculiar condition of dulness described has never been discovered under the circumstances.

This is a question of practical importance with reference to operation for external cancers. In regard of this point I would observe, that, as already mentioned, dyspnœa is the only symptom of even tolerably uniform occurrence in such cases; and that, were dyspnœa to a marked amount (for which physical examination failed to detect any ordinary and obvious cause) to exist in a patient about to be submitted to the knife for the removal of an external cancer, the operation ought to be postponed *sine die.*

To conclude: The most important of the signs of this disease clearly depend on the presence of *tumor.* Nor are there any circumstances (so long as ulceration has not occurred) capable of directly proving the *cancerous* nature of such tumor. The general principles available in the diagnosis of cancerous disease (as the appearance of external growths of this class, family cancerous taint, &c.) must be made use of in determining the characters of the intra-thoracic mass. But, above all, it is to be remembered that tumors, producing the effects described, have in the great majority of cases proved to be carcinomatous.

In the following case (reported under my direction by my clinical clerk, Mr. Figgins) the course and physical signs of a morbid growth occupying the root of the right lung and both mediastina are fully shown.

J. C. (admitted into the Hospital for Consumption under Dr. Walshe, June 28, 1845) a footman, aged 21, below middle stature, born at Sandgate, of temperate habits and melancholic temperament, fond of books, has had hooping-cough and measles, has lived well and been kindly treated. Till March two years ago, had good health, was moderately strong and stout, could run and exert himself to the utmost without inconvenience. In that month had an attack of pain in the head (R. parietal region), not severe, but a dull aching accompanied with vertigo; this continued more or less for five or six weeks; there was great depression of spirits, and a strange deranged state of the mind, which made it necessary to watch him: he did not commit any great extravagance, nor make any attempt on his life. Spirits since at times much depressed; but no similar head-attack, though occasional vertigo from the violence of the cough. Five or six months after this he had shortness of breath (at first slight, but gradually growing severe), with pain in the left hypochondrium; in a "few months afterwards" he began to cough, and then first spit phlegm, streaked with florid blood (never brought up pure blood); this lasted for two or three weeks, was not followed by rusty sputa, and has not recurred. Twelve months ago first had advice, having then a "cold and cough;" he was able to return to work in a week. He has since had several indispositions, and lately had an attack with violent cough, dyspnœa, chills and heats, languor, anorexia, and shooting erratic pains over the right chest, chiefly between the sternum and mamma; he has since been feverish and languid; has dyspnœa under any exertion, especially that of getting up stairs; insomnia, emaciation, inability

without dyspnœa to lie on *left* side. From infancy has had some dysphagia, never increased till within the last twelve months; he points to the hollow behind the sternum as the seat of difficulty; when the food is arrested, he is obliged to drink to force the morsel down, otherwise he is attacked with dyspnœa and cough.

Present state.—He is thin, not emaciated; has lost flesh considerably within the last six weeks; tissues soft and lax; skin cool, natural; attitude stooping, chest inclined forward; walks slowly and carefully; any quick motion produces sharp pricking pain in the *right* chest (no distinct spot) and dyspnœa; lies on right side; feet generally cold and damp; countenance peculiar, and indicative of distress; the eyes have a projecting staring expression; lips (especially the lower) slightly livid; frontal veins remarkably full; memory not good; spinal tenderness along dorsum; voice slightly cracked and weak; swallows liquids well, but solids, even in small quantity, commonly pass with difficulty; the morsel is never rejected, but sometimes passes readily with a little fluid, at other times produces instant and severe coughing, which lasts until it has passed, when the relief is immediate, no pain nor unpleasant sensation remaining; respiration (lying) 38; slightly gasping and wheezing; pulse (lying) 98, not full, compressible, regular in rhythm; no palpitation. Form of abdomen natural, abdominal muscles contract firmly on expiration, the least pressure produces cough, and manifest dyspnœa; upper epigastric vein fuller than natural; on right side — dulness of liver extends to a finger's breadth below the border of the ribs; appetite and digestion good; bowels regular; has slept better for a week past, previously generally awoke at 3 A.M.

Physical signs.—Anteriorly: Notable prominence of right mammary region; soft parts equally thick on both sides; right intercostal spaces somewhat visible during inspiration, less so than on left side in infra-axillary region; *right* jugular considerably swollen; right post. clav. space a little flatter than left; very little movement perceptible on full inspiration in either infra-clavicular region; same in axillary. Vocal fremitus totally absent on prominent part of right side; scarcely perceptible in infra-clavicular region; about natural on left side. In left infra-clav. region percussion-sound pulmonary. In passing from right to left infra-clav. region perc.-sound continues perfectly dull, as far as the left border of sternum. Perfect dulness over entire right side anteriorly, even on gentle percussion; same in infra-axillary region. Respiration in right infra-clav. region hollow, distant, excessively weak; confused, distant, and weak in lower part of this region; in mammary region murmurs lost altogether; in infra-axillary, inspiration totally absent, distant expiration suspected. Vocal resonance moderate; infra-clav. region, resonance obscure; lost in mammary region. *Left* infra-axillary region: over a surface about as large as the hand, a sort of thrill from the heart's action, communicated along the intercostal spaces upwards; sounds much more distinct in that point than in the proper præcordial region; audible under left clavicle, scarcely audible under the right; nothing remarkable in sounds, second rather muffled; he is conscious (as occasionally before now) of a double pulsation in the *right* infra-mammary region; with the stethoscope this is distinctly appreciable, is unaccompanied with sound, is not to be felt on the surface or seen, and seems like an inward succussion or transmitted thrill. *Measurements: circular* ($1\frac{1}{2}$ inch below the nipple) $= 31\frac{1}{2}$ inches; right side $= 16\frac{1}{4}$; left side $= 15\frac{1}{4}$: (in axilla) circular $= 32\frac{1}{2}$; right side $= 17$; left $= 15\frac{1}{2}$: *Antero-posterior* right side, $9\frac{1}{4}$ inches; left, $8\frac{1}{2}$. *Posteriorly:* Percussion duller in right supra-scap. and inter-scap. regions than left; very nearly as clear at right as at left base. In axillary and infra-axillary regions

the difference is marked, the dulness ending suddenly on a vertical line about centre of region, which line is not altered by lying on the face; respiration distant and slightly harsh, in right supra-scap. fossa; at base of right side bronchial; turning round to angle of scap. becomes tubular: in right inter-scap. region, two inches outside spine, distinctly hollow, accompanied with a dry crackling rhonchus. All over the left side, front and back, respiration exaggerated, without any special character. Habeat Mistr. Tr. Camph. Comp. ℥ß urgente tussi.—℞ Plumbi Iod. ʒj., Adipis ℥j; Ung. pro frictione lateris dextri, bis die utend.—℞ Arsenici Iod. g.j.; Ext. Conii ℈ij.; pil. xvj.; j. bis die.—*July* 12. Feels better generally; can lie comfortably on the left side, though not long at a time; is stronger; cough a little better, most troublesome after dinner; better nights; p. 100, soft, compressible, jerking; is weaker and smaller somewhat in right than left radial artery.—*August* 9. Had been improving until to-day, when was seized with severe pain in the right infra-mammary and sternal regions: a blister removed this completely for the time, but it returned again and again; the dyspnœa grew worse, the appetite failed, and the patient grew discouraged.—Five ounces of blood were once taken from the arm to relieve dyspnœa of almost asphyxiating severity; but blisters were as effectual: neither much so.—*August* 30. *Antero-posterior measurements:* right = 10 inches; left = 9¼; intense dyspnœa; he always appeared at *top of his breath*, but now more so than ever; p. feeble, jerking, frequent as before; face quite violet; veins of thorax (the capillary ones) in arborescent patches; left mammary vein very full; left jugular as large as thick swan-quills; the dulness of percussion-sound has now extended to 1½ inch to left of top of sternum; cough excessively troublesome and violent—to-day fainted after a violent fit; scarcely any expectoration. Appetite completely lost; dysphagia not increased; percussion-sound perfectly tubular in the posterior *right* back—*i. e.* in infra-spinous fossa and infra-scap. region, where also the inspiration is distinctly tubular and hollow, with little expiration.—Feeling himself get worse, he became urgent for permission to go home, even though warned of the danger of removal. He got home by railway (to Sandgate) without any very great suffering, but had hæmoptysis in the evening.*

In the following case I had no difficulty in ascertaining the existence of cancerous tumor, though the affection was at a much earlier stage of progress.

In May 1844 I saw (in consultation with Dr. Forbes) a married lady, aged about thirty, menstruating regularly, suffering for about six months from pains in various parts of the chest and acute pain in the right arm, dyspnœa on motion, incapacity to lie in the usual position, and severe fits of *dry* cough. She had no hectic symptoms (the pulse was rarely below 100 however), and was rather fat than thin. Face very slightly livid, lips and ears more so; right external jugular vein enlarged, left also, but less so; thyroid gland full, since veins have enlarged; eyelids full, and sensation of prominence of eyeballs; voice changed, slightly cracked and hoarsish: no dysphagia.—*Physical signs.* (*Anteriorly.*) *Right* infra-clav. region dull, and strongly resistant, under percussion, mammary region almost natural in this respect; vocal fremitus totally absent under the clavicle; sound and resistance natural laterally; liver about natural height; in infra-clav. region

* For the conclusion of this case see Appendix, A.

inspiration bronchial, expiration (in consideration of this special character) very little marked; no bronchophony; respiration not remarkable for weakness here, except close to acromion; post-clavicular region, same characters more marked; respiration feeble in mammary region, almost suppressed at sixth rib. *Left side.* Percussion-sound natural; in axilla slight dulness, which increases downwards, becoming marked at fifth rib; inspiration exaggerated, without excess of expiration, in infra-clav. region; no bronchophony; respiration, distinct in axilla, becomes feeble at fifth rib, and is lost at the base even on deep respiration. (*Posteriorly.*) *Right side.* Slight dulness in external half of supra-scapular region, good elsewhere; in this inner half of the supra-scap. region respiration strongly blowing, with hollow character, circumscribed, expiration very much prolonged, and strong bronchophony; respiration almost suppressed in external half of this region; occasional friction-sound (rubbing variety) here; lower down, respiration natural. *Left side.* Dulness of infra-scap. region and laterally; respiration natural in inner half of supra-scap. region, weak in external half; audible all down, suppressed laterally: no rhonchus anywhere in chest. *Heart.* Impulse slight, dulness of percussion-sound of usual extent, but traceable obliquely upwards across sternum to right infra-clav. region; sounds regular in rhythm, second somewhat muffled; both more audible in right than left infra-clav. region; not audible in the back; no thrill nor murmur in the cardiac region or above the clavicles. No prominence nor alteration of form of any part of the chest.—The distressing dyspnœa was temporarily relieved by the abstraction of twelve ounces of blood; and, through this and the use of ioduretted ointment externally, amendment of short duration followed. I have since learned (the lady was from the country) that a few months later tumor became apparent on the surface of the chest.

§ XXIX. The disease is necessarily fatal, and, as has been shown, is disposed to run a rapid course. Death may also occur suddenly, a fact of which it may be well to give relatives intimation.

§ XXX. The treatment of the affection is in the present state of knowledge purely palliative. Large blisters, frequently repeated, I have found more efficacious than any other warrantable means in relieving intense dyspnœa. If pressure on the large veins exist to such amount as to cause distressing interference with the circulation, small bleedings may be from time to time employed: I have found them afford distinct, but unfortunately only temporary, relief; and the increasing weakness renders frequent repetition of them perfectly inadmissible.

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SECTION VII.

MEDIASTINA.

§ I. The history of mediastinal cancer has in great measure been disposed of in the last section.

§ II. Cancer of the *anterior mediastinum* occurs in the form of small nodules, as a secondary development in cases of cancer of the breast; or the form of large masses, and as an independent affection. Under the latter circumstances it constitutes an effect of antecedent cancer in distant parts, or is the original evidence of cancerous taint. When the disease is primary, it may prove fatal before extension of the morbid growth takes place in the direction of the thoracic viscera, and before secondary growths form in any other situation; or these effects may occur and hasten the fatal issue.

§ III. The condensed narrative of a few cases will suffice to show the chief characters of primary scirrho-encephaloid growths of the mediastina.

M. Martin-Solon* records the case of a man, aged thirty-one, who began in June, 1830, to feel pain in the præcordial region. By examination performed for the first time on the 28th of July, the following facts were elicited: præcordial dulness more marked and extensive than natural; percussion painful here; blowing murmur [where most marked, and whether accompanying one or both sounds, is not mentioned]; purring murmur; respiration indistinct in left lung; shortly after the patient became unable to swallow either solids or fluids. In the beginning of the following September the thorax had become dull throughout, except in the right lateral region; and the sounds heard at first in the cardiac

* Archives de Méd. 1830.

region had become inaudible. The patient died in the last stage of marasmus. The anterior mediastinum was filled with a scirrho-encephaloid tumor, shaped like an inverted heart, and weighing nearly three pounds; both lungs were forcibly compressed by the mass, the heart (only two-thirds the size of that of an adult, and remarkable for the thinness of its walls) detruded backwards towards the spine. There was no other cancer in the body.

In a man, aged thirty-nine, observed by M. Laberge, the mediastinal growth had perforated the sternum; the bone exhibited on its external surface several soft depressible tumors, which rose regularly at each contraction of the heart,—in compressing these the finger passed through the sternum. The stomach, liver, and peritonæum contained cancers.

Oettinger* relates the case of a woman, who six years before her death had had severe hepatitis, and from thenceforth laboured under various abdominal congestive symptoms. Eventually suffocative dyspnœa, swelling, lividity, and anxious expression of the face, incessant dry cough, orthopnœa, sense of weight and tightness of the chest with lancinating pain in the right side, set in. Occasionally paroxysms of cough occurred, terminating by mucous expectoration tinged with blood. The patient died after having kept her bed eleven weeks. The mediastinal tumor is here represented to have been fibro-cartilaginous, and to have contained "ossicula" (whether springing from the sternum, or not, is not stated); it lay posteriorly on the trunks of the great vessels. The lungs, otherwise healthy, contained eleven small encephaloid tumors invested with capsules. In the pericardium were eight ounces of bloody serosity.

Dr. Cowan† has described a scirrho-encephaloid growth, weighing about two pounds, which extended from the lower two-thirds of the trachea to three inches over the bronchi, and destroyed the life of a male, aged forty-five, in about eight months from the occurrence of the first symptoms.

A maid-servant, aged twenty-four, had been eight weeks ill, when M. Skoda,‡ after careful examination of the chest, came to the following diagnosis: hydro-pericarditis to a great amount; double pleuritic effusion; ascites and anasarca consequent on the former; valves natural; lower lobe of lungs compressed. The pericarditic effusion being supposed primary, and the cause of the other serous accumulations, the case was judged a fit one for puncture of the

* Schmidt's Jahrbuch. 1837. † Medical Gazette, May, 1838.

‡ Oesterr. Med. Jahrb., B. xxiv. S. 405. 1841.

pericardium. Accordingly, M. Schuh introduced a trocar close to the left border of the sternum, between the third and fourth ribs. A very little bloody fluid only escaped; through a new puncture, made in the next lower intercostal space, upwards of a pint (seidel) of reddish serum poured out in gushes corresponding to the systole of the heart. So far, no suspicion was entertained of the existence of a morbid growth in the chest. The patient was greatly relieved by the operation; on the following day the œdema of the feet disappeared, the impulse of the heart became perceptible, and its sounds audible; no friction-sound of any kind existed. The improvement continued in such manner that in the course of a month "all fluid had disappeared from the thoracic cavities;" the patient felt almost perfectly well, when without any apparent cause pains set in at the upper part of the sternum and in the neck; subsequently to which event a tumor appeared at the upper part of the sternum, grew in all directions, but especially upwards, and finally carried off the patient by pressure on the trachea and larynx in six months after the operation. An encephaloid mass, embracing the trachea and great vessels, and causing contraction of the former, filled the anterior mediastinum. The pericardium adhered to the heart by thick cellular tissue; "the operation had consequently succeeded." The heart driven downward to the left side, and backwards, was of natural size: the walls of the right auricle, somewhat thickened, were so completely infiltrated with encephaloid, as to appear converted into that substance; numerous spots of similar infiltration were seen in the walls of the ventricles.

The trochar was evidently driven into the mass of encephaloid on the first occasion, and consequently no fluid followed. It may be questioned whether the effusion in the pericardium was really inflammatory, as supposed by Skoda (hydro-pericarditis); it appears more likely to have been simply passive (hydro-pericardium): the cellular adhesions were doubtless an effect of the operation. I have already had occasion (p. 347) to mention that passive pericardial effusion has been found in connexion with intra-thoracic cancer.

Mr. O'Ferrall has briefly described the case of a woman, aged thirty-five, who laboured under cough, orthopnœa, and venous turgescence of the upper part of the trunk. A double blowing murmur was audible at the base of the heart; and the right radial pulse was smaller than the left. The patient had some dysphagia, and her breathing became stridulous before death. The respiration was exaggerated in the left lung. An encephaloid growth filled the anterior and posterior mediastina, and implicated the right lung.

The anguish endured from dyspnœa in some cases of intra-thoracic encephaloid cancer can scarcely be described in language too strong. Nor, as I have myself felt, does the practice of medicine ever place the physician in a position of keener distress, than it does in aggravated cases of this class. Watching the advances of the cancerous growth; measuring the very length and breadth of its offsets;* conscious that day by day, almost hour by hour, the quantity of breathing surface is triflingly, but surely, diminished; and feeling that the wretched sufferer but too aptly illustrates that ruthless torture of the Inquisition, where the victim placed within a chamber with moveable walls, which, slowly and steadily approaching each other, at length reach, and crush all breath from his body; the physician yet possesses no means of controuling the encroachments of the destroying agent, and can scarcely even boast the power of mitigating the tortures he deplores.

SECTION VIII.

DIAPHRAGM.

§ I. Cancerous infiltration of the diaphragm by extension from neighbouring parts, as the œsophagus and liver, is not excessively rare.

§ II. In a case where an encephaloid growth had been removed from the axilla, and local and general reproduction followed, clusters of cancerous nodules were found on the "internal surface of the abdominal muscles and diaphragm."† In a case observed by Dr. Carswell (University College Museum) there appeared in the substance of the diaphragm several tuberculated vascular nodules, varying in diameter from that of a pea to that of half-a-crown, composed of a scirrhous stroma infiltrated with milky-looking matter: the patient, a female, had undergone amputation of the breast. Isolated cancers, it is therefore clear, form in the diaphragm; but of primary carcinoma of this structure I know of no example.

* See the case of J. C., p. 362.

† Lawrence, Med Chir. Trans., vol. viii. p. 310. 1817.

CHAPTER III.

CANCER OF THE ORGANS OF CIRCULATION.

SECTION I.

HEART, ENDOCARDIUM, AND PERICARDIUM.

HEART.

§ I. I AM not aware that any attempt has yet been made towards a systematic description of cancer of the heart. The materials I have succeeded in collecting, throw considerable light upon the anatomical features of the disease.

§ II. Cancer of the heart is not so excessively uncommon as is generally imagined. Six of 8289 deaths are ascribed in the Paris Registers to this organ,—a higher quota than that supplied by several structures in which cancerous disease is familiarly known. I have had no great difficulty in bringing together twenty-five cases scattered through various works and journals; but the almost invariable deficiency of clinical narratives is deeply to be lamented.

§ III. Cancer of the heart occurs solitarily, or in association with similar disease elsewhere. When associated, it appears to be always secondary. In two only of the twenty-five cases is the disease affirmed to have been limited to the heart, and in one of of these the nature of the affection is not positively unopen to question.

§ IV. Encephaloid is the most common species in this organ: of the twenty-five cases, fourteen supply samples of encephaloid; four of scirrhus; three of "lardaceous" cancer; in four instances the formation is simply said to have been "cancerous," but, from internal evidence, the probabilities are that in the greater number of these it was of the encephaloid species.

§ V. In respect of form of deposition, I find fourteen cases in which the organ was the seat of nodular formation; nine in which its structure was infiltrated; and one example of stratiform deposition along the coronary vessels.

§ VI. The extent of the heart's substance infiltrated, when such was the mode of deposition, varied greatly: at one extreme stands

a case in which a minute patch of morbid infiltration only existed; at the other, an instance in which eleven-twelfths of the entire structure of the organ were "converted into" scirrhus, while irregular elevations existed on the internal and external surfaces.* The size of the cancerous nodule has ranged between that of a small pea and a pigeon's egg. In respect of their number, while I find one case in which a single pea-like nodule only was discoverable, Dupuytren records another in which he ceased to count at the six-hundredth. Their shape, rounded, oval, or irregular, is in no wise remarkable.

§ VII. The part of the heart affected varies extremely. In one case, as has just been seen, eleven-twelfths of the entire organ were diseased; the right ventricle in two cases; both ventricles in two cases; both auricles in two; right auricle and ventricle in two; the left ventricle in one; the right auricle and both ventricles in two; both auricles and the septum in one; the anterior wall and the septum in one; the walls of all the cavities in one; the surface in three; in seven cases the part affected is not distinctly stated. In a certain number of instances the morbid product protruded into the *right* cavities of the organ; in one a nodule as large as a bean was seated under the endocardium among the columnæ carneæ of the left ventricle.

§ VIII. The condition of the organ in other respects is rarely described. It is, however, averred, that the structure of the heart was perfectly natural in certain cases, where the disease was of nodular form and consecutive. In no instance has carditis proper, local or general, been noted. Dilatation of the affected cavities, and hypertrophy of their walls, has occurred in a few cases. Alterations, having the characters of those of recent local endocarditis, in one instance existed in the immediate vicinity of cancerous formation: here general adhesions of the pericardium were also present.

§ IX. In no instance does cancer appear to have spread from the heart to any adjacent structure; but, conversely, extension of encephaloid disease from the mediastinum and lung existed in the remarkable cases of Sims and Skoda, already spoken of in the description of pulmonary cancer.

§ X. The heart has been found affected with secondary cancer (the primary disease being seated in a distant organ) when the lungs, and even the liver, had escaped contamination. Parts

* Rullier, Bulletin de la Fac. de Médecine. 1813.

the most various have been the original seats of the disease, when the heart has proved a secondary sufferer; as a sufficient justification of this statement, it may be mentioned that those original seats have been, among others, the lip,* the mamma, the kidneys,† the mediastina, the axilla, the thigh-bone, the muscles of the thigh, &c.

§ XI. Recorded cases do not connect any particular changes of other organs (independently of cancerous disease affecting them) with the existence of cancer of the heart. In instances of very extensive secondary implication of its structure (as in the cases of Dupuytren,‡ Velpeau,§ and Coates), the death of the patients does not clearly appear to have been in any measure accelerated by the cardiac cancer.

§ XII. The extension of the diathesis to the heart (and it is but little disposed to attack this organ) is the most common cause of cardiac cancer. Where the disease is primary, if it acknowledge any special causes, these do not appear from recorded cases. The predominance of the disease among males is very remarkable, however; of nineteen patients two only were females. Their age varied widely: three .scirrhi were found in the heart of a newborn infant by Billard; and, while every decimal period between birth and the age of eighty furnishes examples of the disease, none is particularly distinguished by the fulness of its quota. The number of cases on which these statements rest, is, it must not be forgotten, very limited.

§ XIII. The history of cancer of the heart in respect of symptoms, diagnosis, and treatment, cannot with existing materials be established. The following case has been contributed by Andral.‖ A man, aged thirty-seven at the time of his death, had enjoyed good health till his thirty-fifth year, at which time he began to suffer from slight dyspnœa. This continued, unattended with any other morbid state, five or six months; at the end of which period he was one day seized with severe pain in the præcordial region, whence it radiated to the left side of the chest. At the same moment violent palpitation, great increase of dyspnœa, vomiting, and loss of consciousness occurred; in the course of an hour the pain diminished, and by the following day the patient had recovered his

* Coates, Med. Gazette, January, 1834.

† Rayer, Maladies des Reins, tom. iii.

‡ Vid. Cruveilhier, Essai sur l'Anat. Path., tom. i. p 86. 1816.

§ Cas Remarquable de Maladie Cancéreuse, &c. 1825.

‖ Anat. Pathol., tom. ii. p. 328. 1829.

usual appearance. During the following year the habitual dyspnœa gradually increased in severity, and he had seven or eight paroxysmal attacks such as that described. When seen six weeks before his death, he was emaciated, and the skin had acquired the straw-coloured tint. Pain and palpitation continued to recur occasionally; in the intervals of ease auscultation failed to discover any morbid sign in the heart or lungs. Anasarca of the lower and upper extremities and the face successively set in, and the patient died suddenly without struggle. On the external wall of the right ventricle appeared a tuberculated encephaloid mass, of various amounts of consistence, extending from the apex to the base, and encroaching a little on the auricle; this production had almost taken the place of the entire muscular structure. No other morbid state existed either in the heart or in any other organ.

ENDOCARDIUM.

There is nothing repulsive to reason in the idea of limitation of cancerous disease to the endocardium; but, if such cases really occur, they are singularly rare. The following is the only professed example of the fact I have met with, and the narrative is anything but conclusive. A discharged soldier was admitted into the Hospital of Aix, under the care of M. Payan.* He had rheumatism, chiefly affecting the insteps; soon began to suffer from paroxysmal dyspnœa (slight tactile fremitus and rasping murmur were now discovered in the præcordial region), and died under the anguish of orthopnœa. "One of the aortic valves, at least four times thicker than natural, was transformed into an uneven tuberculated structure. . . . The valve was fragile, and its torn edges exhibited a degenerated friable structure of yellowish-red colour with everted prominences,—appearances which could not be regarded as otherwise than cancerous. A similar change was commencing in the adjoining valve. A deep excavating ulcer existed behind the affected valve, and exhibited the vegetative aspect common in cancerous ulcers."

In the body of a soldier, aged thirty-four, always noted for the turbulence of his conduct, M. Hudellet† found a large lobulated polypiform encephaloid mass attached to the wall of the right auricle, almost completely filling that cavity, and extending into the right ventricle and both venæ cavæ. The continuance of life under

* Revue Médicale, tom. iv. p. 203. Nov. 1841.

† Vid. Cruveilhier, Anat. Pathol., Livraison xxix.

such circumstances is only explicable by supposing the growth of the tumor to have been extremely slow. No suspicion arose before death of an affection of the circulating organs being in existence. The patient died suddenly after a hearty meal, in all probability in consequence of some derangement of the relative position of the diseased mass, the valves and orifices of the organ. The parotid glands (see p. 267) were the only other organs affected with the disease. Neither œdema nor dyspnœa had been observed during life. There is an obvious difficulty in determining whether the connexion of the morbid mass with the endocardium was primary and essential, or secondary and contingent.

PERICARDIUM.

Isolated cancerous disease of the pericardium is excessively rare. Perhaps the most satisfactory evidence of its occurrence is that furnished by a case recorded by Dr. Bright.* In the body of a female, aged seventeen, "a thick layer of yellow malignant matter lined and covered the pericardium, both the portion attached to the heart and the reflected portion; the two deposits were strongly glued together in most parts, and were a quarter of an inch in thickness. In other parts the two layers were easily torn from each other. The phrenic nerve was seen on the right side passing down, pressed upon, and almost embedded in this diseased mass." There were nodules of encephaloid in the subcutaneous texture of the abdomen and chest, and in the right lung; a mass of this substance was found in the anterior mediastinum; the mesenteric and lumbar glands, and both ovaries, were similarly diseased. For three weeks previous to her death, this patient suffered from violent attacks of dyspnœa, generally occurring in the middle of the night, and attended with agitation and shaking of the body, and apparent spasmodic contractions of the diaphragm. The attacks are assimilated by the narrator of the case to those of aggravated hysteria; and ascribed to the condition of the heart and pericardium, especially in consequence of the implication of the phrenic nerve.†

Less uncommon are cases in which the pericardium becomes adherent to cancerous productions formed in the mediastinum, and itself undergoes apparent thickening and infiltration with scirrhous or encephaloid substance.‡

* Medico-Chir. Transactions, vol. xxii. p. 15. 1839.

† See Part II. Chapter VIII. Cancer of Nerves.

‡ Bouillaud, Maladies du Cœur, 1e édit. tom. ii. p. 316. 1835.

SECTION II.

BLOOD-VESSELS.

Such information as the present state of knowledge supplies concerning the anatomy of cancer of the walls or interior of the arteries, veins, and capillaries, has been already given in the first Part of this work

Contradistinguished as are the arterial and venous systems in their pathological relations generally, in none do they more widely differ than in regard of cancerous disease. While in the veins destruction by ulceration, existence of cancerous masses within them, and the production of growths from their walls are all common ; in the arteries ulcerative destruction is excessively rare, of production of cancerous growths from their walls I know of no example, and have encountered but one account (a most imperfect one too) of cancerous substance in their interior.* The difference holds good in respect of the arterial and venous sides of the heart. Its causes are to be found, I believe, in the difference of texture, and (in some respects) of function of the two systems, in the difference of the blood circulating through them, and of the manner in which the circulating forces act in each of the two systems.

* Velpeau (in the aorta) Cas Remarquable, &c.

CHAPTER IV.

CANCER OF THE LYMPHATIC AND LACTEAL SYSTEMS.

SECTION I.

GLANDS.

§ I. Respecting secondary implication of absorbent glands, one o the important phenomena of dissemination of cancerous blastema through the system, sufficient has been said in various parts of thi volume. I shall here simply refer to affection of these glands occurring as the primary evidence of the disease.

§ II. Primary carcinoma of the lymphatic glands is more commonly of the scirrhous than of the encephaloid species; colloid I have never observed, except in the glands adjoining the great cavities of the stomach. The disease is most frequent in the groin axilla, and neck: it occurs as a primary affection, though rarely, i the mesenteric glands.

§ III. Scirrhous infiltration of subcutaneous glands may, in th early stages, be undistinguishable from chronic induration and hypertrophy; the inefficacy of treatment of any kind being in som instances the first circumstance which excites a suspicion of th nature of the case. After having been for a certain time smoot and even, the enlarged gland becomes knotty. The subsequen progress of the disease is that observed in scirrhus of the mamma but ulceration is more slow to occur; and in many cases a sort o excoriation of the investing skin attended with ichorous discharge and alternately healing and opening afresh, continues for a lengt of time the only evidence of destructive tendency. Of this mode o progress of the disease an excellent example is contained in Mr Travers' Essay.*

Encephaloid disease more rarely originates as a primary affectio of these structures. Mr. Mayo† records two interesting cases o carcinoma, both occurring in young girls; the groin was the seat o

* Op. cit., vol. xvii. p. 365.

† Outlines of Pathology, p. 423. 1835.

formation. In one of these persons a blow, followed by extravasation of blood, was the apparently exciting cause of the disease. In one instance the true medullary aspect, in the other the characters of mastoid scirrhus, existed. One of the most remarkable cases of this kind on record, in which both the external and internal glands were affected, is that already referred to elsewhere (pp. 266, 312). The spleen and tonsils were the only other parts diseased in the same manner. A somewhat similar case is related by Mr. Wardrop. Melanic colouring matter has sometimes been seen in encephaloid of the lymphatic glands.

Cases are recorded in which cancer of the absorbent glands has preceded the development of the disease in a communicating parenchymatous organ. I shall recur to the consideration of this point in describing Cancer of the Breast.

§ IV. There can be little question that the operator, who removes cancerous growths originating in these glands, will assuredly fail to cure the disease. Two months sufficed to give rise to appearances of reproduction in one of the cases above referred to from the practice of Mr. Mayo; the other was not interfered with surgically. Such cases are often well adapted for compression.

SECTION II.

VESSELS.

§ I. The instrumentality of the lymphatic vessels in conveying cancerous material through the system has been dwelt on sufficiently (p. 104).

§ II. I am not aware that actual formation, either primary or consecutive, of carcinoma in the component structure of these vessels has ever been distinctly observed. It has probably not been sought after with sufficient closeness. A doubtful case of such formation in the thoracic duct was placed on record by M. Andral,* at a time when he had examined the "thoracic duct and principal lymphatic trunks in upwards of six hundred bodies." In a female, cut off by uterine cancer, the thoracic duct, in addition to being much enlarged and thickened, containing a puriform fluid in its interior, and being in some points itself reduced to a pulpy detritus, exhibited on its inner surface a great number of irregularly rounded, dull white-coloured bodies, of the average size of a pea; these

* Anatomie Pathologique, tom. ii. p. 439. 1829.

bodies "were continuous with the tissue of the walls of the duct." It is possible that the nodules in question may have been the product of simple plastic exudation.—The lymphatics of the abdomen are sometimes obstructed with cancerous matter, when the primary disease is seated in the stomach, and solid nodules may even appear in their interior; but such nodules are not distinctly connected with the parietes of the vessels.

CHAPTER V.

CANCER OF THE URINARY ORGANS.

THE continuity of the lining membranes of the genital and urinary organs, the intimate vascular relations subsisting between them, the manifest physiological influence which the two systems exercise on each other, and the frequency with which disease in the one is evolved under the influence of a morbid state of the other,—are all circumstances which would lead to the inference, that, when either suffers from cancer, the allied system can rarely escape implication. Yet such is far from being the fact. Although cancerous productions do sometimes coexist in the two classes of organ, such coexistence is by no means very common: it is more frequent in the female than the male, especially when occurring as the result of propagation by continuity of tissue.

SECTION I.

KIDNEYS.

§ I. THE kidney is one of those organs in which cancerous disease had till of late years scarcely attracted any attention. It is for this reason difficult, at the present day, to form even an approximative estimate of its absolute or relative frequency. But that implication of this organ is far from being a very rare phenomenon of the cancerous diathesis is matter of established notoriety; while its occurrence as a primary disease is less uncommon than is generally fancied. I have been enabled to collect from various sources (a few of them supplied by my own observation) forty examples of renal cancer; upon these the following description is based. Of these forty cases, thirteen have been contributed by M. Rayer.

§ II. When cancer affects the kidney, the disease is rarely limited to that organ; and in the great majority of cases, where other parts are implicated, the disease has obviously originated primarily in some one or other of these parts.

Cancer less frequently affects the bladder and kidneys simultaneously, than might be expected. When the renal structures suffer

along with numerous other parts, the organs thus associated in the disease vary in all conceivable manners. The cases before me bear out M. Rayer in his assertion of the frequent coexistence of cancer of the liver and right kidney, and of the adjacent parts of the stomach or the descending colon and left kidney.

§ III. In thirty-six of the cases referred to, the anatomical state is described with considerable accuracy. In thirty-one of these, pure encephaloid, or one of its varieties, was the species of cancer observed; scirrhus in five only,—two of them of doubtful character; while colloid did not in any instance occur in this situation. Encephaloid exhibits itself in all degrees of consistence, and in several of its varieties. Among these varieties, the hæmatoid may almost be considered frequent, as compared with its rarity in other internal organs. Blood, in various conditions of fluidity or coagulation, is associated with the encephaloid matter; and the tint of the whole varies with the relative quantities of blood and cancerous substance present, as also with the amount of coagulation the former has undergone. The light-yellow tint of fibrin is sometimes visible over a broad surface. Cancerous masses of this kind are allied in some of their anatomical characters, as has been noticed by Rayer, to nodules of renal apoplexy; the rounded shape and circumscription of the masses, together with the abundant infiltration of blood in both conditions, explains the similitude. The cancerous tumor is distinguished by the presence of encephaloid matter amidst the blood, and by the existence of similar disease in other parts and organs. Very close examination may be required for the detection of characteristic particles amid the preponderating blood; and, though I have not observed this in the kidney, I have no difficulty in imagining that the aid of a lens might be necessary.

§ IV. With respect to the length of time occupied by encephaloid masses in this situation in softening and breaking down into detritus, I am unable to make any less vague statement than that the tendency of renal cancer is to pass through its stages rather rapidly, when primary,—rather slowly, when secondary. The process of destruction of the renal substance and of softening of the cancer leads to the formation of compartments or cavities, sometimes of large dimensions, filled more or less completely with cancerous pulp, puriform matter and coagulated or liquid, florid or dark, unaltered or decomposed blood. The cavities thus produced may form shut sacs, or communicate with, and pour their contents into, the calices and ureter; or in rare cases, into the extra-renal cellular tissue, the peritonæal cavity, or the interior of some portion of the intestine.

The latter mode of communication,* which has been observed to occur with the colon and the duodenum, is excessively rare.

Cancerous detritus in the kidney frequently exhibits a granular aspect and yellowish-green colour,—conditions which have been mistaken for the evidence of admixture of true tuberculous matter with encephaloid pulp. These peculiarities depend simply on the presence of softened and disintegrated fibrin and the discoloration produced by infiltration of blood: abundance of altered fatty matter sometimes changes greatly the appearance of the mass.

§ V. Encephaloid occurs in the kidney in the infiltrated and tuberous forms: the former more especially when the disease is primary, the latter when secondary. Cancerous infiltration (as organic diseases generally) commences in the cortical substance. This structure may in some positions disappear altogether under the influence of the accumulating cancerous matter, without the tubular substance having suffered in the least. The nodular form of the affection likewise originates in the cortical substance, generally near the surface; as the masses enlarge, they become prominent on the surface, and assume the appearance of having formed between the surface of the kidney and its capsule. Commonly these nodules occur in numbers; they are then usually of small size,—that of a pea, a nut, or a walnut, for instance. Single masses sometimes acquire very considerable dimensions; but it is impossible to decide whether the primary renal growths of enormous bulk (weighing for instance fifteen pounds and upwards), sometimes met with, may have originated by infiltration, or in the form of a circumscribed nodule or nodules.

In some cases the cancerous disease affects the various parts of the organ pretty equally; in others the morbid matter accumulates, especially at the convex surface of the kidney or in its upper half, while the lower part remains perfectly untainted.

§ VI. I have not myself met with cancer having the anatomical characters of pure scirrhus; but I have seen encephaloid in that condition of firmness, when it possesses some slight translucency. Wilson (loc. cit. p. 284) describes an alleged example of scirrhous disease; the tissue of the kidney was converted into "a substance nearly as solid as, and feeling like, softened cartilage, of brownish hue, and intersected by thin, white, membranous septa." Von Walther found the left kidney "scirrhous" in a young man aged seventeen; the organ was enlarged, its tissue creaked under

* Giraldès in Rayer, Maladies des Reins, t. iii. p. 705.

the scalpel, and was in some spots cartilaginiform, and in others excavated (König, loc. cit., p. 230). The Ephemerides Naturæ Curiosorum contain another case of doubtful character. These statements do not justify the admission of scirrhus of the kidney as an actually observed state. But among the unpublished drawings of Dr. Carswell, in the Collection of University College, appears one of scirrhus of the kidney: "the entire of the organ was converted into a grey-coloured substance, somewhat transparent, and of the hardness of fibrous tissue. It was intersected in various directions by pale-coloured bands, which were opaque, and firmer than the intermediate grey substance. It yielded only a small quantity of serosity on pressure, and presented few or no blood-vessels." The liver contained cancerous tumors also. M. Rayer has also seen scirrhous substance, "with the appearance it so commonly presents in the mamma,—that of bands of irregular striæ, and a bluish-white, firmly resistant tissue, traversing the cancerous masses in various directions." These appearances were noticed either in the midst of encephaloid substance, or, more rarely, in the neighbourhood of fibrinous deposits. Even here the close connexion of the scirrhous productions with encephaloid cannot fail to be observed.

§ VII. The condition of the renal tissue, exempt from the cancer affecting other parts of the organ, varies. In the tuberous form of the disease it is not very uncommon to find the tissue intervening between the nodules quite healthy; in other cases it is congested, inflamed, or actually (but this is very rare) in a state of suppuration,—the pus being infiltrated or accumulated in a single spot. M. Rayer has delineated a collection of pus occurring beneath the fibrous capsule under these circumstances. When the cancerous disease is limited to any particular part of the organ, as its upper half for example, the rest may become hypertrophous. While the cortical substance is cancerous, the tubular is sometimes indurated and atrophous. I have met with no credible account of the development of tuberculous matter in the tissue of a kidney of which some other part was cancerous, nor in the fellow-organ of a kidney so affected. Numerous vague statements have been made by Cruveilhier and others respecting the presence of tuberculous matter in the actual substance of renal cancer; but the appearance is a deceptive one, and to be accounted for in the manner just (p. 379) explained. Melanic discoloration of cancerous masses is occasionally, but rarely, witnessed in the kidney.

Cancer of the kidney may coexist with some varieties of the

calculous diathesis. The pelvis contained an oxalic acid calculus in one case related by Dr. Bright, and a lithic acid one in another.

§ VIII. It is not uncommon to find the renal veins plugged with cancerous masses or with coagula, exhibiting in some parts the encephaloid aspect; such coagula extend not unfrequently into the vena cava inferior, and sometimes even to the right auricle (Velpeau, Moritz*).

The lymphatic glands and vessels frequently share in the cancerous disease of the organ they communicate with; and Rayer shows the danger incurred by their implication in a figure where the glands are seen united into a mass pressing upon the pelvis and the origin of the ureter. They are sometimes more extensively diseased than the kidneys themselves.

§ IX. Masses originating in the kidney itself sometimes perforate the intervening tissue, and protrude into the pelvis and orifice of the ureter; but these parts are very rarely the seat of separate development of the morbid substance. The pelvis and infundibula are sometimes greatly dilated and filled with serous fluid, a state commonly arising from the external pressure just referred to, — sometimes, however, from the presence of cancer in their interior. The pelvis, in a case observed by Dr. Bright, was dilated into a huge pouch, containing about two pints of a "brownish fluid, like coagulated blood of long standing."

The fibrous capsule of the kidney may be greatly thickened; the thickening bearing perhaps more particularly upon the subfibrous cellular membrane.

While the cancerous growths continue of small size, the kidney may not present any very obvious change in shape or bulk. With the advance of the disease, whatever be its form, both these properties undergo change. The organ may become large enough, as I have seen it, to fill three-fourths of the abdomen, and exhibit all varieties of tuberous deformity. The tuberosities on the surface then vary in point of size from a nut to an orange; and, in respect of colour and external vascularity, exhibit almost endless variety. In these cases of advanced disorganisation no trace of renal tissue may be discoverable.

§ X. In thirty-five cases of renal cancer the disease affected both organs sixteen times; the right alone thirteen times, the left alone six. The proportion of examples of double cancer would be much lower, if cases, wherein the renal disease was a mere evidence of

* De Pathologia ac Diag. Aneurys. Internor. Bresl. 1835.

the diathesis, were excluded from the estimate. In not a few of the instances where the left organ suffered alone, local violence appears to have played some part in the development of the disease. Both these qualifications of the general result tend to make more obvious the especial proneness of the right kidney to the disease (p. 96). When renal cancer follows the removal of a cancerous testicle, the disease is sometimes confined to one kidney.

The kidney, free from the cancerous disease affecting its fellow, may be perfectly healthy; simply congested; or in a state of chronic inflammation: or it may contain cysts; be atrophous (this is very rare); or hypertrophous, a condition less frequent than might be anticipated.

§ XI. The state of the organs and tissues of persons cut off with renal cancer varies so widely in different cases, that I can scarcely lay down any general proposition on the subject. The affection, at all events, very rarely proves fatal in individuals free from other disease,—by far the most common coexisting morbid state being cancerous deposition in other situations. Marks of recent peritonitis (whether resulting from the irritation of the adjoining tumor or—infinitely more rarely—from actual escape of some of its fluid materials into the peritonæal cavity) are met with more frequently than in persons dying with cancer unconnected with the abdominal viscera.

§ XII. The ages of thirty-one persons dying with cancer of the kidney were as follow:

Age.	No. of Cases.	Age.	No. of Cases.
0 to 1	1	30 to 39	3
1 — 2	1	40 — 49	1
2 — 9	0	50 — 59	10
10 — 19	1	60 — 69	9
20 — 29	3	70 — 79	2

It appears from this table, that, while at no period of life can individuals be considered exempt from the chances of cancer affecting the kidney, those of advanced years are by far the most prone to suffer from this, as they are from other, diseases of that organ. On the other hand, infants are not only the occasional victims of renal encephaloid; but in them some of the most satisfactory examples of the disease proving fatal, independently of complication in any other organ, have been witnessed. Setting aside the two cases occurring before the tenth year, the mean age at death in the twenty-nine remaining instances was 52·14 years.

As males are more subject to disease generally of the kidney

than females, so are they to cancer of that organ. Of forty persons dying with renal cancer, twenty-four were males, sixteen females,—a ratio of 3 : 2. But the proportion of the former sex afflicted with renal disease of all kinds indiscriminately is very much higher than that signified by this ratio;* it is obviously lowered in respect of cancer by the countervailing greater tendency of females to that affection.

The existence of cancer of the kidney does not necessarily imply that of previous bad state of constitution, though, generally speaking, ill-health precedes its development. Its formation may proceed simultaneously with pregnancy, as shown by M. Aubé's and one of Dr. Bright's cases; the infant in the latter case "is said to have been healthy." In both instances parturition was laborious and protracted; in Dr. Bright's case this was probably due to the size of the tumor, in the other the difficulty could not have arisen thus.

In the instance last referred to, the disease was ascribed by the patient to a fall, by which the side was injured. M. Rayer has recorded a case in which a violent effort producing a sensation of rupture in the left lumbar region, and followed by hæmaturia, seems to have been the first appreciable local phenomenon in the evolution of an encephaloid mass; but the patient had had a sarcocele removed years before. Some other examples of a similar kind are to be met with; but they are few in number and unsatisfactory in character.

On the whole, no clear connexion can be traced between diseases of the urinary system generally and the development of cancer. Still the coexistence of cancer and chronic nephritis, and of that product with calculi of different species, has been witnessed.

§ XIII. Upon the duration of renal cancer I have scarcely anything to communicate worthy of attention. The disease too frequently runs a latent course for a time (in rare cases even to the death of the individual) to allow of any trustworthy general calculation being made. I am, however, inclined to believe that the kidney is one of those organs in which the disease, reckoning from the first appearance of symptoms, runs a relatively rapid course,—a circumstance in part explicable by the comparatively greater frequency here of the encephaloid species of the morbid product.

* Of 1416 deaths occurring in 1841, in all England (except the Metropolis), from diseases of the urinary organs, 1161 were furnished by the male population, 255 by the female.

Few contributors of cases trouble themselves about ascertaining the period, at which the symptoms set in; six cases are all I can find (two of them observed by myself) in which, while the renal disease was either solitary, or (though associated with other cancers) exercised its own obvious influence on the patient's state, the duration of the symptoms is noted. The mean duration in these cases was eight months; two months and a half less than that of encephaloid disease of all organs indiscriminately.

§ XIV. (*a.*) The cases are extremely rare in which death occurs without any renal symptom at all having manifested itself; nor has such absence of symptoms ever been witnessed, except when the disease in the kidney was either very limited in extent, or merely an evidence of the diathesis. Less uncommon are cases in which pain of variable character is the sole effect of the disease; such is generally the fact until the organ has increased sufficiently in size to produce tumor appreciable externally. The pain, seated deeply in one or both of the renal regions, is almost always continuous; but is sometimes dull, and at others sharp and lancinating. When of the latter kind, it does not always shoot in the direction of the ureter and bladder; and may be referred especially to the anterior wall of the abdomen. On the other hand, there may be suffering in the hypogastrium and none in the renal regions, though the bladder be perfectly sound. In whichever site pain exist, the urine may continue acid, and in all its characters natural.

(*b.*) The period of latency has ceased, when appreciable tumor exists, or when hæmaturia, or other obvious alteration of the urine, has declared itself. Marked enlargement may take place without discharge of bloody urine, but it is excessively rare to observe hæmaturia (when the cancerous disease is limited to the *substance* of the kidney) without tumor. Upon the characters of this tumor, and the condition of the urine, the *direct* diagnosis of the affection completely depends.

The *tumor*, seated in the lumbar region, varies in size, and may scarcely protrude beyond the false ribs, or reach inferiorly the crista of the ileum; it may extend laterally considerably beyond the umbilicus, detruding the integuments of the umbilical region downwards and to the opposite side; and anteriorly obviously push forward the abdominal walls: these walls may, or may not, bear evident marks of distension; and may, or may not, be permeated by swollen veins. In the lumbar region fulness and prominence are sometimes distinctly visible and palpable, when the patient is examined in the standing posture; but in some cases

very obvious tumor may exist anteriorly, and no intumescence be perceptible posteriorly. In some cases the mass appears adherent to the two lower ribs; but in others no traces of such kind of attachment are discoverable. The tumor is irregularly circumscribed, unevenly tuberous on the surface, unequally prominent, and unequally resistant in its different parts, variously elastic, but never really fluctuating; whether the seat of spontaneous pain or not, it is almost invariably tender under pressure. Its dimensions are best ascertainable posteriorly by the dull sound emitted under percussion, which (instead of being limited, as in the natural state, to a space varying from two to three inches outside the spine) extends laterally to the flank; anteriorly, the amphoric note of the intestine is often producible over a limited portion of the dull-sounding surface, from folds of intestine lying in front of the tumor,—the presence of this latter peculiarity is important in diagnosis, but its absence does not justify the conclusion that the tumor under examination is not renal. The colour of the surrounding skin is unaffected. The growth of the tumor has generally been rapid, and may have been remarkably so: a man, whom M. Rayer (on the evidence of previous removal of a cancerous testicle, the existence of enlargement of the liver, slight yellowish discoloration of the skin, and obstinate hæmaturia) had pronounced to be the subject of renal cancer, left the hospital without local signs of tumor, and returned in ten days with those signs existing in an obvious manner. Hæmorrhage into the substance of the tumor may in such cases have much to do with the rapid increase of bulk.

The *urine* may, and commonly does, retain its natural characters in respect of acidity, transparence, and colour, in cases where the organ has undergone no material enlargement from the cancerous growths within it. Slight alkaline reaction has sometimes, under these circumstances, been observed, along with unusual tendency to rapid decomposition: these conditions I believe to depend upon the irritative action of the cancerous products on the renal tissue; chronic irritation of the kidneys leading habitually to the secretion of urine deficient in acid reaction. But tumor of considerable dimensions may exist without notable alteration of the urine; nay, more, both kidneys may be the seat of such tumors, and yet their secretion exhibit no unhealthy characters. In such cases the proper tissue of the organs must rather be pushed aside, than encroached upon, by the growing masses.

But when the disease is advanced, and the renal structure implicated at all deeply, changes in the urine are constant,—these

changes consisting essentially of the presence in that fluid of blood or certain of its elements, of pus or encephaloid matter. *Hæmaturia*, dependant upon this disease, denotes either the breaking-up of cancerous tumor, and the communication of its contents with the excretory passages, or the coexistence of cancer in the calices or pelvis; the symptom is most common when the vascular system of the new growth is abundantly developed. It does not necessarily remain a continuous symptom after it has once occurred: all discharge of blood ceases in some instances for days at a time, the cessation depending upon mere suspension of hæmorrhage; or, as Rayer has suggested, upon the passages being temporarily plugged with coagula; or, I may add, with fragments of encephaloid substance. The quantity of blood passed may be trifling, sufficient only to discolour the fluid; or in rare cases abundant enough to constitute disquieting hæmorrhage. Coagula are sometimes discharged; narrow and elongated in shape, when formed in the ureter,—amorphous, when in the bladder. As in all cases of hæmaturia, where coagulation occurs in the bladder, there is laborious micturition, and occasional tendency to retention. *Albuminuria* may arise, as has been observed by Dr. Christison,* "in connexion with cerebriform degeneration of the kidney." This I can imagine to depend upon discharge of encephaloid matter or of pus; nor can I doubt that it may also be produced in cancerous cases by a draining of liquor sanguinis, unassociated with red corpuscles, continuing for a variable period after an attack of actual hæmaturia. At least, though I have not witnessed this in renal cancer, I have distinctly and repeatedly observed the occurrence in two cases of renal hæmorrhage of a different character, and totally unconnected with the disease described by Dr. Bright (albuminous nephritis). But such albuminuria (judging from the cases I refer to) does not persist for more than a few days after the cessation of hæmorrhage.—*Discharge of purulent urine* is sometimes observed in these cases, but never to the extent witnessed in pyelitis with distension of the calices and pelvis. When it is present to any extent, the pus is in all probability furnished by the mucous membrane of those parts, and is more likely to mislead the practitioner, than facilitate his diagnosis. The *discharge of encephaloid pulp* from the kidney, cognizable by its physical characters, is at the least singularly rare; but the microscope would, it is to be presumed, not unfrequently disclose its presence.

* Granular Degeneration of the Kidneys, p. 40.

These various foreign matters form into a sediment, if the urine be allowed to stand; the supernatant fluid is turbid, fœtid, and readily putrefies. With the advance of the disease, the urine grows thicker and thicker, diminishes in quantity, and is passed with such difficulty, that, towards the close, some patients void only a few drops at a time, and this at stool.

According to M. Rayer, *retraction of the testicle* (so common a symptom of calculous pyelitis, where retention of urine follows obstruction of the ureter by a calculus) is of rare occurrence in renal cancer. The symptom is certainly not noted in any of the cases I have found in periodicals or elsewhere.

The *digestive organs* suffer almost invariably. Anorexia, ending in total disgust for food of every kind, occurs sooner or later; I find no case in which renal cancer was prominently marked, and in which the appetite was preserved to the last. Nausea and vomiting sometimes add to the patient's suffering. The bowels may be constipated, or excessively relaxed; they are very rarely in a natural state: relaxation may in some cases be caused by the irritation arising from the close proximity of the morbid formation to the ascending or descending colon,—in others, softening or marks of chronic inflammation are found to account for it.

The *cancerous cachexia* is not commonly highly developed. The straw-coloured tint of the skin does not become very obvious, generally speaking; there may, or may not, be febrile action of much intensity,—and, if present, this rather depends upon complications than upon the renal affection; the loss of flesh is commensurate with the failure of appetite. Œdema of the lower extremities is common; it may be a mere evidence of general impoverishment of the blood and of debility, or be directly produced through obstruction of the inferior cava and renal veins by fibrinous coagula or cancerous masses. General dropsy (of rare occurrence) has been witnessed by Rayer.

§ XV. Death, in cases of renal cancer, sometimes occurs as the gradual result of the constitutional effects of the disease, favoured specially by the debilitating influence of repeated hæmorrhage. Rupture of the tumor from a blow, and consequent effusion of blood into the peritonæal cavity, may prove the immediate cause of the fatal event (Bright, Case X). It is a curious fact, that patients afflicted with cancer of the kidney do not, as so commonly happens when the organ is affected with diseases of other kinds, die comatose; on the contrary, the intellectual faculties sometimes remain clear to the last, even in the very worst cases.

§ XVI. The facility with which renal cancer may be diagnosticated, will vary with the nature of its symptoms. When absolutely *latent*, I know of no means of detecting the disease, even should attention be directed to the kidneys and the qualities of the urine: physical diagnosis cannot achieve the triumphs in respect of the kidney, that it habitually does in regard of the lung. Nor will the supervention of pain alone in the renal regions be of much assistance to the observer; there is nothing characteristic in the suffering produced by cancer in this situation. Should, however, such pains be persistent and severe, while they manifestly proceed from the site occupied by the kidney, and should evidence of cancerous disease present itself in other organs, or a testicle have been previously removed for that affection, strong grounds will exist for believing that the diathesis has extended to the kidney. If there be dull or sharp pains in the thighs and legs, accompanied or not with occasional cramp in those parts, the renal origin of the pain will be rendered more certain.

A careful examination of the *tumor* produced by an enlarged kidney, (the bowels having been previously well emptied,) with due consideration of the commemorative and existing symptoms, will generally enable the observer to determine that that organ is the seat of the enlargement. But experience shows that such is not always the fact, and that renal tumors have been mistaken (where neither carelessness nor, still less, ignorance on the part of the observer could be suspected) for enlargements of very different organs. Tumors of the *right* kidney have been taken for diseased enlargement of the liver, or for certain affections of the cæcum or ascending colon; of the *left* kidney, for tumors of the spleen and morbid conditions of the descending colon; of *either* kidney, for tumors of the mesenteric glands, of the ovaries, or of the uterus. I shall briefly point out the chief circumstances which may be relied upon at the bed-side as diagnostic of these different states, premising that in each individual case thorough examinatiou of its entire history will probably lead to the determination of one or more special facts, which cannot be referred to in a general description,

From enlargements of the *liver* renal tumors may be distinguished by: 1. Their neither themselves rising high into the chest, nor detruding the liver upwards to any considerable amount; hepatic tumors, when of great bulk, may reach to within three inches of the clavicle; 2. The fingers can commonly be passed between the ribs and the enlarged kidney; not so with the enlarged liver; 3. In the majority of cases, a portion of intestine lies in front of renal

tumors (as may be ascertained by the amphoric percussion-note); unless in singularly rare cases of malformation, no intestine lies on the anterior surface of the liver; 4. With hepatic tumors generally coexist some derangements of the biliary secretion; jaundiced tint of the skin and sclerotics; febrile urine (p. 117), or presence of the colouring matter of the bile in that fluid, as discoverable by the green precipitate produced by nitric acid; besides, there are no renal symptoms. — Tumor, constituted by distension of the *gall-bladder* with bile, is characterised by its pyriform shape, and distinguishable from renal enlargement by not giving rise to extensive dulness of sound posteriorly: hepatic symptoms also localise the swelling.*—Distension of the *cæcum and ascending colon* with accumulated fæces and flatus is more difficult to distinguish from an enlarged kidney than might be supposed. Still, the percussion-note, dull in some points of the mass, amphoric in others; the doughy feel; the tenderness under manual examination; the situation of the enlargement, which lies lower and more sunk into the pelvis, than if produced by the kidney; the existence, commonly, of severe intestinal symptoms and absence of renal disturbance; and, lastly, the influence of purgatives in diminishing the swelling,—are all circumstances distinguishing the intestinal from the renal tumor. The diagnostic marks do not materially differ, whether the stoppage in the bowel be connected with cancerous disease of its coats or not.—Tumors formed by enlargement of the *spleen* come more towards the front of the abdomen than renal swellings; they do not furnish a dull sound *posteriorly* proportional to their size; no intestine lies in front of them; they tend to rise high in the chest; they have less tendency to pass towards the middle line, except superiorly, where they protrude in the direction of the fundus of the stomach; their outline may be much better defined than that of renal tumors, and the hand sometimes passed behind their free border. The pre-existence of intermittent fever, and, if so, the influence not unfrequently exercised by quinine in diminishing the intumescence, coupled with the absence of renal symptoms, will further, in certain cases, distinguish splenic from renal enlargement. Tumors of the *ovary* lie lower in the abdomen than those of the kidney, so that no intestinal amphoric percussion-note can be detected between them and the brim of the pelvis; they have a greater tendency to occupy the middle line than renal tumors, whence the amphoric note may be discovered over a space of some

* Petit, Remarques sur les Tumeurs formées par la Bile. (Mém. de l'Acad. Royale de Chirurgie, tom. i. p. 155.)

width *outside* them; they do not give rise to dull percussion-sound in the back proportional to their bulk; they are more moveable than the enlarged kidney, and may be pushed with the hand towards the pelvis; if the finger be introduced into the vagina, and pressure be made on the hypogastrium, while a sudden jerk is given to the neck of the womb with that finger, the mediate connexion of the mass with the uterus becomes more or less obvious; occasionally, the patient is able to satisfy the observer that the tumor made its first appearance on one side of the pelvis, low down, and has, with its increasing growth, risen into the abdomen, whereas the enlarging kidney tends to grow from above downwards.—If the *uterus* be the seat of morbid growths, either in its substance, or in connexion with its peritonæal coat, in such manner as to give rise to obvious tumor, the true seat of this may be distinguished by the phenomena of vaginal examination just described, as also by the commonly open state of the cervix uteri; the uterus is seated unusually low in the vagina; raised with the point of the finger, its weight appears unusually great; the tumor generally occupies the middle line, and the amphoric percussion-note of the intestine is distinguishable on both sides outside the tumor; there is no special dulness in either renal region posteriorly; and the hand cannot be passed between the morbid mass and the brim of the pelvis.—A remarkable instance in which abdominal enlargement produced by tumors of both kidneys was mistaken for *pregnancy* is related by F. A. Walter;* but, in point of fact, the renal symptoms were here so evident, that the error could not have been committed at the present day. It is to be observed, that all affections of the uterus and ovaries taken together can only by possibility give rise to error in one-third of cases of renal cancer; as such is the proportional contingent of this disease furnished by the female sex.

In doubtful cases the existence of hæmaturia occasionally settles the question of the seat of the tumor. But suppose that no evident renal tumor can be detected, what are the conditions of the hæmaturia by which its direct origin in the kidney may be inferred? Pain in one or both renal regions; the absence of all signs of disease of the bladder and prostate, as ascertained by the catheter and otherwise; and occasionally the excretion of clots of vermicular form,—are the chief circumstances indicative of the renal origin of *hæmorrhage*. Some stress has been laid by writers upon an alleged

* Einige Krankheiten der Nieren und Harnblase. Berlin, 1800.

peculiarity,—intimate union of the blood with the urine, when the former is furnished by the kidney; but I believe that the accuracy of the observation is questionable, that the degree of mixture must often prove clinically incapable of being determinable, and I know I have seen cases in which blood, coming from the bladder, was as perfectly and equably mingled with the urine, as could possibly be conceived. It is to be remembered, that renal cancer very rarely gives rise to hæmorrhage, unless when tumor is discoverable externally.

But the diagnosis is far from being completed, when we have satisfied ourselves that a given abdominal tumor springs from the kidney: we have still the problem of its *nature* (often the more difficult of the two) to solve. The circumstances tending directly to prove the cancerous character of a renal tumor are rapidity and irregularity of growth of the mass, its unevenness of outline, the different amounts of consistence discoverable in its various parts, perhaps some amount of pseudo-fluctuation in certain spots, discharge of encephaloid detritus with the urine, the existence of cancer in other organs, the presence of the cancerous cachexia, and the absence of tuberculous disease in the lungs. Should neither calculi, pus, nor acephalocysts have been voided with the urine, the cancerous nature of the mass will be rendered still further probable.

Tuberculous disease of the kidney (an excessively rare affection) occurs after the age of fifteen in phthisical subjects only;* it seldom or never gives rise to any considerable enlargement of the organ, (unless there be accidental distension of the calices and pelvis with urine and softened tuberculous matter,) and the microscopical characters of tubercle may sometimes be detected in the urine, either where that product, deposited in the kidney, escapes by ulceration into the excretory passages, or is previously formed on the surface of the renal portion of those passages.—*Simple cysts* rarely give rise to much enlargement of the organ; the kidney is not the seat of pain or of tenderness under pressure or percussion; the growth of the mass is slow, and hæmaturia is not observed.—

* M. Rayer says, that, when tubercles exist in the kidneys, similar productions are "almost always" found in the lungs. (Op. cit. tom. iii. p. 623.) M. Rayer's proposition, as it stands, may, for aught I have ascertained to the contrary, be true, if applied to persons of all ages indiscriminately; but the experience of M. Louis (Rech. sur la Phthisie, 2ème édit. p. 134; Paris, 1843; or Walshe's Translation, p. 112,) shows it to be at least doubtful that after the age of fifteen the kidneys ever suffer, unless when the lungs are themselves tuberculized.

Accumulations of *acephalocyst hydatids* sometimes give rise to great enlargement of the kidney. The pathognomonic signs of the tumor thus caused are the hydatid fremitus, and discharge of these entozoa with the urine. But the former phenomenon is with difficulty ascertained; and unless the containing cysts undergo rupture into the excretory passages, no acephalocysts can of course make their way into the bladder. Under these circumstances the absence or presence of the special characters of cancerous tumor must serve as the observer's guide.—*Extra-renal abscess* occasionally gives rise to such swelling in the renal region, as might upon superficial examination be mistaken for the effect of cancerous disease. But the history of the case, the fluctuation, the altered condition of the skin, the marked tenderness under pressure, the character of the pain, the œdema of the subcutaneous cellular membrane, and eventually the pointing of the swelling, will sufficiently display its true nature.—In consequence of injuries of various kinds in the renal regions, *hæmorrhage and accumulation of blood* in the substance of the kidney, the calices and pelvis, sufficient to cause notable tumor, sometimes occur. The enlargement originating in this manner may be distinguished by the history of the case, by the sudden development of hæmaturia, by the purity of the blood discharged, for, at least in the early periods, neither pus nor other morbid matter is mingled with it. It is not to be forgotten (p. 383), that a connexion of cause and effect appears sometimes traceable between such effusions of blood and the evolution of cancer.—*Hydronephrosis* (as accumulation of urine and serous fluid in the pelvis and calices, with distension of those cavities, has been conveniently termed by M. Rayer) may be distinguished from cancerous growths by the evenly rounded shape of the tumor, by the marked fluctuation of which it is the seat, by the freedom from pain or tenderness in the part, by the uniformity of character of the tumor in all its parts, and by the healthy appearance of the urine, which contains no pus nor other unusual material except mucus in slight excess. If the tumor were found reducible by gentle pressure, from the passage of its contents into the bladder, (as witnessed by Mr. Estlin,) the diagnosis would, if possible, be still more satisfactorily established.—*Calculous disease of the kidney* leading to chronic inflammation of the pelvis (pyelitis of Rayer), with distension of its own cavity and of the calices with pus, urine, and serosity, occasionally produces tumor of great bulk, which may be more readily confounded, than any other species of disease, with cancerous enlargement. But the pyelitic

tumor may be known by the fluctuation of which it is the seat; by its less uneven surface; by the similar sensation it conveys to the hand in all its parts, unless, as is singularly rare, a calculus can be actually felt (under which circumstances the diagnosis will be greatly facilitated); by the constant and considerable discharge of pus with the urine (much more abundant than is ever observed in cases of pure cancer); by the less frequency and severity of hæmaturia; and by the signs, past or present, of some form of calculous diathesis. A sensation of collision of calculi in the tumor has sometimes been perceptible to the patient or to the observer; but this is singularly unusual. As has been already intimated, encephaloid vegetations, in some very rare cases, spring from the walls of the pelvis and calices in cases of calculous pyelitis; the diagnosis is under these circumstances matter of impossibility.

§ XVII. Organic diseases of the kidney, generally, are within certain limits more compatible with life, than serious affections of any other equally important structure. Of the general truth of this proposition there can be no doubt. But the inference to which I have been led respecting the mean duration of cancer of this organ shows that that affection must be considered an exception. The hygienic and constitutional management, which materially prolongs the life of persons labouring under other varieties of renal disease, fails, comparatively speaking, in those suffering from cancer. Nevertheless existence may be rendered much more comfortable by careful treatment.

The diet, as in cancerous disease generally, should be nutritious, unless some special contra-indication (such as the occurrence of hæmaturia) exist. Upon this point I find M. Rayer's opinion as decided as my own. Astringents, and iron in various forms, the same writer considers useful in warding off attacks of hæmaturia and the cachectic symptoms, especially general dropsy.

I know of no remedy having the slightest claim to specific action in these cases. But the great relief afforded by opium in affections of the urinary passages generally entitles it to trial even in them, and experience proves its worth. I am not aware that conium has any claim to particular notice in respect of renal cancer.

I have not, as M. Rayer appears to have done, seen moxas and issues applied to the loins in cases of renal cancer. But I have seen much and varied suffering follow their application in other species of disease of the kidney, and never known them productive of the smallest benefit: I speak of cases of chronic nephritis and pyelitis especially. *A fortiori*, in cases of can-

cer, these counter-irritants are likely to prove useless and detrimental.

Local abstraction of blood may occasionally become advisable (before the cachexia has set in) for the relief of pain, or for the suspension of hæmaturia. But milder means (such as, in regard of pain, emollient applications, &c.) should first be tried. Cold applications to the loins, bladders of ice, &c., and the usual internal remedies, should precede blood-letting in cases of hæmaturia; but if there be much feverish reaction, or if these means fail, the patient should be cupped in the loins, to such extent as his general condition justifies.

The stoppage to the flow of urine produced by accumulation of fibrinous clots or fragments of cancer may be relieved by the full use of diluents. Catheterism, and even injection of warm water into the bladder, may be rendered necessary by accumulation of the kind in its interior.

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SECTION II.

SUPRA-RENAL CAPSULES.

§ I. This appendage to the kidney is not unfrequently similarly affected, when the organ is itself cancerous; and that of the right side has been found to have become carcinomatous under the influence of (or at least in connexion with) growths of the same species in the liver. M. Rayer* has never seen the supra-renal capsules affected except under these circumstances.

§ II. The disease may exhibit itself in the tuberous or infiltrated forms; of the latter I have seen one remarkable specimen, in which the affected capsule was from three to four times as large as that on the other side. The capsule was here more extensively diseased than the kidney itself.

* L'Expérience, Nov. 10, 1837.

§ III. This case leads to the idea that a renal cancerous tumor, as discoverable during life, may be in greater measure formed in the capsule than in connexion with the renal tissues themselves. But I know of no means whereby such localisation could be established before death; nor can I, in the existing state of knowledge, believe the diagnosis possible.

SECTION III.

RENAL PELVIS AND INFUNDIBULA.

§ I. These portions of the excretory system of the kidney occasionally contain cancerous matter, under one or other of the following conditions. (*a.*) Cancerous vegetations of fringed, cauliflower, or flattened aspect, spring from the sub-mucous tissue of the pelvis, free from all connexion with any coexisting renal cancer. Rayer has recorded a case (unique as far as I can ascertain) in which masses of the kind were found without similar, or indeed any, disease in the kidney. (Op. cit. t. iii. p. 700.) (*b.*) A cancerous growth in the kidney may protrude into the upper excretory passages, in the manneral ready described (p. 381). (*c.*) Semi-liquid cancerous matter, effused from the kidney, has been found occupying the renal pelvis,—whether destined to have permanently stagnated there, or merely temporarily arrested *in transitu* to the bladder. (*d.*) A cancerous lumbar gland may perforate, and vegetate within, the pelvis (Univ. Coll. Museum, No. 2189).

§ II. In some of these cases the pelvis undergoes dilatation proportional to the increase of bulk of the kidney, and may be completely crammed with the morbid substance. The flow of urine, secreted by the yet unaffected parts of the kidney, is obstructed; and in this way the implication of the passages becomes symptomatically of more serious import than of the renal tissues themselves. In some of these cases the walls of the pelvis, undergoing hypertrophous thickening, present the columnar appearance so common in the bladder under the influence of obstruction in the urethra: a figure illustrating this fact has been published by M. Rayer.

SECTION IV.

URETERS.

(*a.*) In the case just referred to, M. Rayer found isolated pedunculated growths of the encephaloid species springing from the walls,

into the cavities, of the ureters. (*b.*) Cancerous matter, discharged from the kidney, stagnates occasionally in the ureter. (*c.*) The lower end of the ureter sometimes becomes implicated by cancerous disease extending from the bladder, whether the affection of this organ be primary, or consecutive to uterine carcinoma.

SECTION V.

BLADDER.

§ I. The statistics published by M. Tanchou amply confirm the statement I formerly made, that primary carcinoma of the bladder is far from being so uncommon an affection, as the general language of writers would lead us to believe: 72 of 8289 deaths from cancerous disease were produced by implication of the bladder. And I have no hesitation in affirming that the estimate would be higher, were it not that the vague term "fungus" is habitually applied by reporters of cases to growths, which attentive consideration, even of the terms used in their description, shows to have been wholly or partially composed of scirrhus or encephaloid. Nor are authors of deserved eminence free from error on the subject: Sœmmerring carried it to its height by denying wholly the existence of primary cancerous tumor. Lallemand affirms that the disease is extremely rare. M. Civiale contributes, by his mode of arranging vesical diseases, to give authority to the prevalent notion of the rarity of the disease; for he includes under the head "fungus" a case in which (in the language of its observer) "the bladder contained four or five carcinomatous tumors of various sizes," and another in which the morbid production was "pulpy, whitish, and cerebriform."* "Fungi" may of course, while their nature is undefined, be fairly made the subject of surgical operation (provided tearing away structures in connexion with the mucous membrane of the bladder be, on general grounds, recognized as a judicious measure); and the desire to relieve human suffering by manual proceedings, where others have failed, may have thus led practitioners to give the innocent name of "fungi" to perfectly characterised cancers.

It is to be apprehended that the ultimate effect of the attempt to pass off cancers for "fungi" may be a different one from that designed; and that the existence of benignant polypoid growths from

* Traité de l'Affection Calculeuse, pp. 322, 329. Paris, 1838.

the walls of the bladder, will be altogether denied, or at least made matter of question. But the fact is that benignant productions do form in this situation: those which I have myself seen were either composed of the mucous and submucous tissues in a state of simple hypertrophy; or the latter texture was besides infiltrated with serous or gelatiniform fluid; or the mass was formed of solid cellulo-fibrous adventitious structure invested with mucous membrane, the density of the fibrous tissue sometimes almost assimilating it to cartilage; or lastly (as I have in one instance only observed) of imperfect erectile tissue. The first, second, and fourth of these kinds of formation may become the seat of carcinomatous deposit, —in other words become cancerous.

§ II. The frequent occurrence of secondary cancer of the female bladder, arising through propagation of the disease from the uterus, is matter of notoriety. Cancer of the rectum, also, spreads in rare instances to the bladder.

§ III. Scirrhus, either tuberiform or stratiform, is comparatively rare in this organ. In a remarkable case, described by Lallemand, "all the membranes were transformed into a lardaceous scirrhous substance, two inches thick behind the prostate, and extending two or three inches in every direction;" and Mr. S. Cooper has described a distinct example of scirrhous tumor of this organ occurring in a man, in whom the femur of one side and a rib were infiltrated with the same morbid matter. Sir B. Brodie has never met with a tumor "wholly resembling scirrhus," but has occasionally observed part of a morbid growth to be thus constituted.

Tuberiform encephaloid is the form under which the adventitious product most commonly exhibits itself; growths of all varieties of consistence, from the hardest mass to a diffluent creamy pulp, are observed. The surface of the tumor is often smooth before destruction of the mucous coat has occurred; but sometimes irregularly tuberous or botryoidal, even from an early period of its existence. After that destruction it generally becomes externally uneven, from soft sprouting fungi developed on its surface: these vegetations are generally highly vascular; the basis, from which they spring, may be hard, and comparatively free from vessels. The mass may be broad-based or pedunculated; and either studded with patches of, or completely encrusted with, calculous substance. Civiale quotes a case from Ledran, in which carcinomatous matter was found accumulated between the superficial asperities of a calculus.

§ IV. In the great majority of cases there is but one tumor discovered; in some instances two or three have been found: I have

found no case on record where any considerable number (as is on the contrary not very uncommon in the instance of non-cancerous growths) were seated in this organ.

§ V. The most common seat of the new formation is the triangular space between the orifices of the ureters and of the urethra, and the parts immediately adjoining this space. Cancer also occasionally springs from the fundus and anterior or posterior surfaces, but has very rarely been observed on the lateral aspects of the organ. The growth in some instances occupies a very considerable extent of surface; or cauliflower fungous masses, spreading from a narrow basis, may acquire great bulk (of both clenched hands in a case observed by Desault), and almost completely fill the cavity of the viscus. The submucous cellular tunic is commonly the original nidus of the new production.

§ VI. The mode of progress of the disease is the same as in the other hollow viscera. But, although the contrary is sometimes the fact, the morbid mass is, generally speaking, slow in ulcerating,—a circumstance which has much contributed to keep alive the current notion of the rarity of vesical cancer. Commonly contracted, the bladder is sometimes enlarged: its walls are usually hypertrophous, and the mucous membrane exhibits the "columnar" appearance. Evidences of cystitis are in some cases seen in vascular injection, thickening, mammillation, and either softening or hardening of the mucous tunic. Calculous disease frequently coexists with the carcinomatous growth.

The prostate may be perfectly healthy in respect of size and properties of tissue, although the vesical cancer spring from the corresponding part of the bladder, and in close contiguity with the gland. Not a few cases are on record proving this. In other instances, cancer of the prostate coexists; and an enormous excavation, constituting a sort of second bladder, may be formed out of the enlarged gland and the space between the prostate, bladder, and rectum. The bowel may be perforated in one or more places, and the patient discharge urine *per anum*. Abscesses in these situations sometimes hasten his destruction.

§ VII. The condition of the kidneys and upper part of the urinary passages differs in cases of vesical cancer. Those parts may be healthy; the kidneys may be softened and enlarged without obvious alteration of structure, or be the seat of small abscesses; the ureters and pelvis may be acutely inflamed, or exhibit the characters of chronic calculous pyelitis with distension. Coexistence of cancer in the kidney with primary cancer in the bladder is, espe-

cially when we consider the intimate functional connexion of the parts, singularly rare.

In a case observed by Amussat (that of a man aged eighty-six) the left vesicula seminalis was found full of pus, and the mucous membrane of the posterior two-thirds of the urethra reduced to a state of pulpy detritus.

§ VIII. Primary cancer of the bladder, as also cancer arising in this organ independently of extension from a neighbouring part, is almost peculiarly an affection of the male. In a remarkable case, however, described by Rayer (op. cit. t. iii. p. 699) and already referred to (p. 395), the bladder of a female, aged fifty-eight, contained a cancerous mass formed of an agglomeration of small rounded tumors encrusted with calculous matter. Amussat has also recorded an example of cancer of the female bladder and urethra, which appears to have been primary.

The disease is one of mature or advanced life. The mean age at death of fourteen persons, upon whose cases I have founded the description of the disease given in these pages, was fifty-three years. The affection does not appear to occur before the fortieth year.

As regards special causes, I know of none. The majority of the patients had had gonorrhœa once or more; but, as ninety-nine hundredths of males who reach the age of forty have probably been in the same predicament, there is no motive for connecting the two states as cause and effect.

§ IX. Among their earliest symptoms, persons affected with vesical cancer suffer from frequent inclination to void their urine, and from difficulty in satisfying the desire. The fluid is passed in a small stream, or even *guttatim*, and total retention sometimes occurs. Uneasiness (increasing after urine has been passed) is experienced at the neck of the bladder: this occasionally amounts to exceedingly severe pain, and shoots to the perinæum and anus, and along the urethra to the glans. In the cases observed by Desault and Lallemand, there was continuous pain of the lancinating kind in the hypogastrium; while a patient observed by Chopart referred his sufferings more especially to the rectum. It is obvious that the effects of these growths on the excretion of the urine must vary with their precise dimensions and site. If seated close to the orifices of the ureters, they may press on and dilate these ducts by causing an accumulation of urine within them (a state attended with almost complete retention), and give rise to pain and other symptoms of irritation in the kidneys. If the internal orifice of the urethra be partially obstructed, the urine is passed (and this is the most ordi-

nary case) in the manner above described. If the opening of that canal be completely blocked up, either in consequence of the growing size of the tumor, or separation of pulpy cancerous detritus or clots of blood, temporary or continuous retention may arise. And lastly, if the growth be pedunculated, and therefore partially moveable, a full stream may be suddenly and repeatedly arrested (as in a case observed by Velpeau*) before the contents of the bladder are on each occasion completely evacuated. The *urine* is usually turbid, and often contains that ropy matter commonly described as "catarrhal" or mucous, but which is in reality pus modified in character by the action of ammonia evolved by the decomposition of urea. Hæmaturia, in some cases constant, in others of rare occurrence, occasionally hastens the patient's death by its violence and pertinacity. Here, as in other organs, discharge of blood may be the first symptom of carcinoma; it has been observed by Sir B. Brodie before pain or frequent micturition had been complained of. Clots of blood may contain encephaloid in their substance, or be otherwise associated with that matter, and be discharged in this state.

The growth may, as in two cases observed by Civiale, produce a distinct *tumor* in the hypogastrium. In one of these the cancerous disease coexisted with calculus; and, as the former appeared "of inconsiderable size and stationary," it was believed to depend on thickening of the walls of the bladder: the patient underwent lithotomy, and died: a cancerous mass sprang from the posterior aspect of the viscus. In the other instance, the presence of an irregularly rounded tuberous mass in the hypogastrium, combined with other local and general signs of cancerous disease, left no doubt as to the nature of the affection: the tumor, originating at the anterior surface of the organ, had destroyed that portion of its walls, and contracted adhesions with the abdominal parietes. The destruction has in other instances gone further; the fungous mass protruding at the groin or pubic region, or perforating the walls of the colon.

The neighbouring parts are irritated by the presence of the foreign body, and *defecation* is frequently, and with difficulty, performed: where the growth has attained considerable bulk, it may, by pressing on the bowel, entail obstinate constipation.

The existence of a fungous carcinoma in the bladder predisposes, as all other causes interfering with the free excretion of the urine, to hypersecretion of phosphatic salts, and consequent deposition of calculous matter of that species.

* Médecine Opératoire, tom. iii. p. 696.

§ X. Patients with vesical cancer may die the cachectic death of cancerous individuals generally; this is very rare. Much more commonly the disease becomes fatal by disturbance of the urinary functions; and suppression of urine, delirium and coma, close the scene. In some cases these symptoms have arisen rather from other coexisting disease in the bladder, than from the cancerous affection itself. The immediate cause of death has in some instances been uncontrollable hæmaturia.

§ XI. The duration of the disease varies within wide limits. I have cases before me in which it did not exceed six months;—others, in which it reached an indeterminate, but considerable, number of years.

§ XII. Speculatively considered, nothing can appear more easy than the diagnosis of this affection, especially when a tumor of any size exists. Experience proves that the fact is far otherwise. Lallemand holds that the existence of lancinating pains behind the os pubis, and emission of morsels of "decomposed fleshy matter," are the only symptoms whereby cancer of the bladder may be recognized with any certainty. M. Civiale, equally sceptical of the signification of general symptoms, emaciation, fever, nervous phenomena, &c. (as having no special character in these cases,) attaches little importance to the nature of the pain, and even thinks that the discharge of encephaloid matter may be confounded with the ropy excretion of chronic calculous cystitis, &c.

The truth is, that in numerous cases a positive diagnosis is unattainable. But the excretion of encephaloid detritus, cognisable by its obvious physical properties, has in some instances removed all doubt as to the nature of the affection; and it is quite possible, that, by microscopical examination of the sediment and coagula discharged with the urine, cancer-cells might be discovered, and the question of diagnosis be thus, at a comparatively early period, set at rest. M. Civiale strains after difficulties in his assertion that encephaloid matter mingled with the urine may be mistaken for catarrhal discharge; nothing but careless observation could lead to an error of the kind.

Albuminuria, depending either on impregnation with pus or cancerous matter, may sometimes no doubt be discoverable by the ordinary tests; but, unless as corroborative evidence, it would be of little diagnostic utility.

If hæmaturia exist, the absence of renal symptoms and the evident presence of some affection of the bladder will connect that symptom with the latter organ. The mode of excretion of the

blood varies so much, that little dependence can be placed on this as a sign: thus, the urine may be clear at first, and bloody at the close of micturition; or at first bloody, then clear, and subsequently bloody again; or the blood may be discharged in clots; or, as is most rare, mixed thoroughly and from first to last with the urine. The existence of admixture of the blood, or of a coagulated state of this fluid, will depend much on the amount to which the bladder is filled with urine when hæmorrhage occurs. Let it be supposed, however, that the vesical origin of the hæmaturia is established,—if the discharge be exceedingly abundant, or if it recur repeatedly without apparent cause (such as the jolting motion of horse or carriage exercise, or the operation of sounding), the inference is, that it rather depends on cancerous, than on calculous or other vesical disease. Still, such inference is far from being necessarily correct.

The evidence of catheterism will also guide the practitioner in distinguishing the affection; yet the most practised hand will not always succeed in distinguishing vesical tumors from calculi by this process. Although in some cases, from the extreme softness of the morbid growth, the distinction is comparatively easy, and in others, encephaloid pulp being carried away in the eye of the catheter, error becomes actually impossible; yet in the majority of instances (especially if the tumor be firm) the sensations received by the operator are not so easily distinguishable from those produced by a calculus, as might *à priori* be supposed. The difficulty of the diagnosis will be greatly increased, if a calculus coexist with a cancerous tumor. Civiale relates a remarkable example of this. A calculous person, desirous of undergoing lithotrity, was admitted into the Necker Hospital. The presumed size of the stone and the contracted state of the bladder, coupled with narrowness of the urethra, led M. Civiale to fear that that mode of operation would prove impracticable. He, however, succeeded in seizing the stone; but the patient suffered so much from swelling of the testicle and otherwise, that lithotomy (the bilateral operation) was shortly after performed by M. Laugier. The extraction of the calculus was easily effected; but the patient died on the ninth day. Neither catheterism, nor the manipulations required in lithotrity and lithotomy had led to the detection or even the suspicion of the existence of the disease disclosed by post-mortem examination:—"An enormous tumor occupied the posterior wall of the bladder, so softened in the centre as to form a cavity, which might have been taken for the bladder itself; the real bladder was in front of, and above, the

cancerous mass." A tumor was felt during life in the hypogastrium, and was manifestly caused by the calculus, pushed upwards and forwards by the subjacent morbid growth.

If a cancerous tumor be incrusted with calculous deposit, there are no known means of ascertaining, during life, the nature of the nucleus of this unusual species of calculus.

In cases of doubtful character mediate auscultation has been recommended; and, as air is a better conductor of sound than water, previous inflation of the bladder suggested. But of the practical utility of such proceedings doubts may be entertained. Dr. Costello (with whose admirable tact in all manipulations connected with the urinary organs I have had several opportunities of becoming acquainted) would not trust to the evidence of the stethoscope, where simple catheterism left him undecided as to the nature of the disease.

Thorough examination of the bladder is scarcely practicable in these cases, in consequence of the pain and serious hæmorrhage it may induce, or of the danger incurred of exciting a fatal attack of cystitis: here has evidently been one of the chief causes of error in some cases. And in sounding or catheterising patients with vesical cancer, there is one point to be borne especially in mind,—namely, that the morbid production sometimes pushes the posterior part of the bladder back, and thus increases to a remarkable amount the length of the prostatic portion of the urethra. In illustration of this fact, which has been noticed by M. Civiale, I may mention, that Dr. Costello having on one occasion, as he informs me, provided himself with an unusually long catheter for the purpose of examining a patient affected with this disease, found it impossible, although he carried the instrument as far as practicable into the passages, to reach the posterior wall of the bladder.

In those extremely rare cases where the female is the subject of the primary disease, its diagnosis will be much facilitated by placing a finger of the left hand in the vagina, while a sound is introduced into the bladder with the right.

The general condition of the patient, in the evidences of cancerous cachexia, will sometimes assist materially in the diagnosis. But this source of information may on the other hand completely fail. In Civiale's case, just referred to, the double disease of the bladder had, strange to relate, produced no characteristic constitutional suffering.

§ XIII. The only special question which arises in respect of the treatment of cancer of the bladder, is that of the practicability of

removing morbid growths of this class by operation. Warner* long since proved the possibility of removing a tumor from the female bladder by ligature, when the meatus urinarius had previously undergone much dilatation. Lecat invented instruments for performing a similar operation on the male.† Covillard‡ cut a man for a tumor the size of a nut, and squeezed it with forceps, after which it appears to have sloughed away, the patient eventually recovering. M. Civiale has revived these practices, and succeeded with ease in removing "fungi," either by tearing them away or breaking them down. But whatever may be the success of such operations, when practised upon growths of cellulo-fibrous or perhaps of imperfect erectile structure, there can be no doubt that their performance is inadmissible, where the new production is carcinomatous. Palliative treatment, especially of such sort as is best calculated to sooth irritation of the urinary organs, is, in cases of this stamp, the only kind warrantable.

Bibliography.—*Chopart*, Maladies des Voies Urin., tom. i. p. 466; edit. 1821. *Desault*, Malad. des Voies Urin., p. 177, 3rd edit. *Lallemand*, Malad. des Organes Génito-Urin., p. 1; 1825. *Amussat*, Cancer Cérébrif. de la Vessie, Gaz. Médicale, p. 71; Fevrier, 1830. *S. Cooper*, Med. Chir. Trans., vol. xvii. p. 51; Lond. 1832. *Brodie*, Dis. of Urin. Organs, 2nd ed.; Lond. *Civiale*, Traité de l'Affection Calculeuse, p. 322; 1838. *Civiale*, Maladies des Organes Génito-Urinaires, tom. iii. p. 83; Paris, 1842.

SECTION VI.

URETHRA.

OF THE MALE.

M. Lallemand's case of cancer of the bladder, just referred to (p. 397), furnishes the only satisfactory example I am acquainted with of carcinoma originating as an isolated mass in the male urethra. The disease was not a prolongation of, or production from, the morbid mass in the bladder (and even of this description it is rare), but "a cancerous tumor of the size of a nut situate at the posterior surface of the canal, and behind the bulb." The investing mucous membrane was destroyed, probably by the caustic which had been employed to remove the stricture presumed to exist during life.

* Phil. Trans., vol. xlvi. p. 414. 1749.

† Stacke, in Phil. Trans., vol. xlvii. p. 292. 1751.

‡ Observ. Iatrochirurgiques, p. 92. Strasb. 1791.

When the prostate is in an advanced state of cancer, the portion of the urethra embraced by the gland is sometimes more or less destroyed by the same disease.

M. Lallemand sees no way by which a tumor, such as that observed by himself, could be distinguished from an ordinary stricture; more especially when, as in this case, the patient had had blennorrhagia, and been cured by the ordinary method of treatment.

OF THE FEMALE.

§ I. The female urethra is sometimes the seat of cancerous disease, either from the extension of adjacent carcinoma or independently of such propagation. Of the former description, exhibiting itself in the areolar pultaceous variety, a striking example has been figured by M. Cruveilhier.* The walls of the canal, throughout its entire length and circumference, were in this instance converted into a hollow cylinder of that morbid product, and communicated on the posterior and inferior aspects with a similar cancer of the vagina and uterus. Amussat removed a fungous tumor from the orifice of the urethra of a woman, who eventually perished from cerebriform cancer of the bladder; the anterior wall of the uterus is said to have appeared healthy, yet was destroyed by the contiguity of the vesical encephaloid, which was in the corresponding part softer than elsewhere.† Ulcerations (especially of the venereal class) of the orifice of the urethra occasionally become the seat of cancerous deposit, independently of any similar disease in the rest of the genito-urinary system.

§ II. It seems probable that the cellulo-vascular tumor of the lip of the meatus, said to be distinguished by its extreme sensibility from carcinomatous growths, may secondarily acquire a basis of scirrhus, or become infiltrated with encephaloid matter.—In a woman, at present under my care at University College Hospital, the orifice of the urethra presents a fringed cellulo-vascular-looking production, bleeding on slight pressure, and readily breaking up under the finger, but neither spontaneously painful nor sensitive to the touch: the entire under-wall of the urethra (as ascertained by Mr. Quain and myself) is infiltrated so extensively with solid substance extending even to the neck of the bladder, as to form a mass as thick as the index-finger; this is the occasional seat of lancinating pain: the neck of the uterus is natural. The woman's health de-

* Anat. Pathol., Livrais. xxiii. Pl. vi.

† Gaz. Méd., p. 71. Fev. 1830.

clines, and the skin is of straw-coloured tint. I believe this affection to be cancerous.

§ III. When the urethral production coexists with deep-seated disease, it is of course submitting the patient to unnecessary pain to attempt its removal. Under the contrary circumstances this has been effected with the knife; and the apprehension of excising part of the canal need not, in itself, stay the hand of the operator, as cicatrization follows rapidly, and the shortened part continues to execute its functions satisfactorily. The only immediate inconvenience to be expected from removing part of the meatus urinarius (as results from an examination of numerous cases by Dr. Hosack*) is retention of urine. And this is the very opposite of a common occurrence, for two only among all the cases referred to by this writer were thus complicated,—one related by Mr. Hughes (1769), and the other by himself. In both instances this symptom disappeared spontaneously on the fifth or sixth days.

* New York Journ. of Med. p. 29. July, 1839.

CHAPTER VI.

CANCER OF THE GENITAL ORGANS.

The genital organs suffer from cancerous disease with most unequal frequency in the two sexes. Although there can be no question that the number of deaths from uterine carcinoma is overrated in the Paris Registers, yet, making due allowance for this, the following comparison of females and males in this respect still continues most striking. Of 8289 deaths from cancer of specified seat, the genital organs furnished the following share: with these organs I have connected the breast.

OF THE MALE.		OF THE FEMALE.	
Testicle	21 cases.	Uterus	2996 cases.
Penis	10	Ovary	64
Scrotum	7	Vagina	14
Prostate	5	Vulva	2
	43		3076
Breast	5	Breast	1147
	48		4223

Sexual difference is greatly less apparent on the part of the urinary than the genital system. It appears, from the calculation I have given in a previous page (p. 383), founded, unfortunately, on a very small number of cases, that the male and female kidneys are affected with cancer in the ratio of 3 : 2;—a difference, comparatively speaking, altogether insignificant.

MALE GENITAL ORGANS.

SECTION I.

PENIS.

§ I. Scirrhus is, in the great majority of instances, the species of cancer occurring primarily in this organ; a basis of scirrhus, however, frequently gives origin to vegetations of encephaloid character, furnishing creamy fluid in abundance. Primary encepha-

loid tumors are of extremely rare occurrence; in an instance of the kind which fell under the notice of M. Buret, a mass of the size of a pigeon's egg presented internally the exact appearance of semi-putrid infant brain.

§ II. Cancer of the penis may originate in almost all parts of the organ; but the glans and prepuce are by far its most common primary seat. The encephaloid tumor observed by M. Buret sprang from the cellular membrane lying between the fibrous sheath and skin of the dorsum; and this writer states that the substance of the sheath itself, and also the erectile tissue of the urethra, may be the original nidus of cancerous production. In whatever situation the disease first appears, its tendency is sooner or later to involve the rest of the organ. In persons affected with congenital phymosis, there may be great difficulty in determining whether the disease originated in the glans or in the prepuce.

§ III. The modes of origin of scirrhus of the penis are various. It may originate from (*a.*) a warty excrescence, either on the surface of the prepuce, the glans, or the frænum; or (*b.*) infiltrate the glans, so as to convert that part into an indurated mass; or (*c.*) first attract notice as a "pimple," which discharges an excoriating fluid, scabs, and breaks out afresh, while induration, followed by ulceration, advances at its base; or (*d.*) venereal ulcers may become complicated by carcinomatous deposition, and fungate in the same manner as primary cancer.

§ IV. According to M. Buret, where the disease is seated in the skin, prepuce, or cellular tissue of the penis, the inguinal glands are the first to undergo enlargement; on the contrary, the pelvic suffer earliest, where the more deeply seated parts are affected. Secondary cancers in connected organs are of uncommon occurrence: among distant parts, the liver is occasionally the seat of cancerous masses in these cases; but visceral cancers are, as a general fact, comparatively rare.

§ V. I have already (p. 144) touched upon the question of the production of cancer of the penis, through coitus with persons afflicted with uterine or vaginal carcinoma. The disease is most common in persons of middle and somewhat advanced age.

Several observers, among others Hey, Boyer, Roux, Travers, and Bégin, coincide in remarking on the frequency of phymosis, either congenital or acquired, in individuals labouring under cancer of the penis. The irritation, produced by the confined preputial secretion and accumulation of drops of urine, &c., is supposed to be the cause of the disease under these circumstances; I see no

reason for doubting that such irritation may act as an exciting cause in persons possessed of the necessary state of constitution for the generation of cancer, especially as it would appear, from the observations of Mr. Travers, that Jews are very rarely, to say the least, the subjects of the malady. Cancer of the penis, however, does occur in subjects differently conformed: I have had occasion to observe the disease in a person whose glans had been uncovered from childhood, and three out of twelve patients treated by Hey were free from phymosis. Common irritation of other kinds appears capable of inducing development of the disease, where the constitutional bias is strongly in its favour. Such, doubtless, was the bias of the unfortunate gentleman, whose prepuce had been deeply lacerated by a golden lock (fastened to the part by a jealous mistress), and whose penis, becoming subsequently cancerous, was amputated by Dupuytren.*

§ VI. The pain suffered in cancer of this organ is not commonly severe. It does occasionally acquire great intensity, however, and wears the lancinating, cutting, or burning characters. It may be continuous or intermittent.

The rapidity of progress of the affection varies much. Although sometimes almost acute in its course, months, or even years, may elapse before induration and ulceration, beginning in the prepuce or glans, spreads to the corpora cavernosa. The scirrhous induration is, besides, often slow in passing into the ulcerated stage, producing a sensation of weight, slight aching pain, and difficulty in discharging the urine, (such as in some cases to require the constant use of the catheter,) for months, it may be years, before this change occurs. Such was the state of things in the instance of a man, whose penis (scirrhous throughout the glans and over a certain extent of the corpora cavernosa and septum) I find in the Museum of University College. The organ generally is considerably swollen.

The progress of the warty excrescence is said to be usually the most rapid: I am inclined to doubt this. Sexual indulgence may be imagined to accelerate the advance of the disease, but from actual experience upon this point I can say nothing.

The discharge from the ulcerated surface is commonly abundant, and remarkable for its fœtor and irritative properties: sores on the scrotum may be produced by contact with it. Vegetation from the exposed surface sets in; and the cauliflower masses produced, some-

* Legros, in L'Expérience, No. 58. Août, 1838.

times form, together with the swollen glans and prepuce, a tumor as large as the clenched hand. The tendency to ulceration is in some cases much more marked than in others; the organ may be destroyed as far almost as the os pubis.

The constitutional symptoms are those of cancer generally; but they do not commonly exhibit themselves in their most intense form.

§ VII. (*a.*) When the disease is allowed to run its natural course, it may cut off the patient by the local and general effects of cancer, without implicating any other part; or, in rare cases, the malady becomes comparatively stationary in the penis, and the patient perishes from the active progress of consecutive cancers in the lymphatic glands. Disease of the bladder and prostate have much influence on the fatal event in some cases. (*b.*) When amputation has been performed, the progress of the disease in the stump and external lymphatic system cuts off the sufferer: the cancerous inguinal glands often bleed profusely. I am not acquainted with any case in which death could be distinctly traced to the influence of visceral cancers.

§ VIII. There is an intractable fungus of the prepuce and ulcer of the glans which Mr. Travers refers to as being, "strictly speaking, neither venereal nor cancerous," and for which amputation of the organ is commonly practised; though, as the same writer observes, "the life of the patient is scarcely prolonged by the operation, perhaps abridged." The affection occurs in men under thirty years of age, and, according to Mr. Travers' experience, is connected with tuberculous disease of the lungs.—M. Buret has twice observed a peculiar indurated state of the anterior half of one side of the penis; the tissue thus affected is dense, firm, free from pain, and diminished in size, and the organ becomes curved in that direction during erection. This condition is perfectly distinct, he conceives, from scirrhous hardening, but he does not state the means of distinguishing them: the absence of pain will aid in the distinction, and the affected part of the organ is one in which true scirrhus very rarely, to say the least, commences.—A patient may present himself with phymosis and puriform discharge from the glans, ascribed to neglected gonorrhœa, but in reality connected, as examination discloses, with scirrhus of that part of the penis: this has especially been observed, as might be expected, in persons of rather advanced age.

§ IX. The important fact of the connexion of phymosis with cancer of the penis, coupled with that of the occasional hereditary

character of the disease, seems to me (p. 192) to warrant us in counselling early circumcision in the case of persons having congenital phymosis, and belonging to a family, the members of which have been known to perish from cancer. Circumcision, however, cannot, of course, be recommended as infallibly prophylactic; Mr. Travers operated on a man, cut for phymosis ten years before, in whom a pimple on the side of the frænum ulcerated, and assumed the form of cauliflower fungus, completely surrounding the glans, while the latter remained sound.

When the disease is actually established, removal of the morbid mass with the knife would appear to afford the only chance of saving the patient. And, unfortunately, this chance is a singularly sorry one. General experience corroborates the statement of Mr. Travers, that, "if the penis be amputated at some distance beyond the hardened part, and before the disease has existed long, the patient *may* escape a return of it; but this is a *rare instance of good-fortune*. Slight symptomatic enlargement of the glands in the groin should not be accounted a bar to the operation, and, on the other hand, the absence of all glandular affection is no security against its return and *fatal termination in three months*." Some forms of the disease are, however, according to the same surgeon, more favourable for operation than others; "the irritable pimple," either of the glans or prepuce, breaking into a hard-based, spreading, and fungating ulcer, is more likely to be followed by reproduction, than the form commencing as a warty excrescence.

Presuming removal of the disease to have been determined on, the question, whether excision of the morbid production, or amputation of the organ, is to be performed, arises. Experience strongly exposes the inefficacy of excision. Mr. Travers "holds it to be quite useless to remove the prepuce alone, in any case of malignant sore or excrescence, however free the glans may be from ulceration." All writers, with the exception of M. Lisfranc, express themselves in a similar strain. This surgeon, having dissected penises (removed as extensively carcinomatous) in which he ascertained that the disease was only superficial, and did not involve the corpora cavernosa; and having further reflected on the power of the albugineous tissues to resist cancerous infiltration; decided upon trying, whether amputation of the organ (the effects of which on the mind of the sufferer he describes in piteous, but probably not exaggerated, terms) might not be safely given up for excision of the affected parts. Here we have, to a certain

extent, a revival of principles taught by Callisen.* In order to ascertain the depth of the disease with certainty, M. Lisfranc recommends the diseased mass to be cautiously divided through the centre down to the fibrous sheath; if this be healthy, the diseased parts may be excised; if not, amputation must at once be performed. To this mode of procedure it may be objected, that, although the fibrous tissue appear healthy, it may really contain germina of the disease; that the operation is of longer duration, and the incision useless, if amputation be eventually required. The real value of the first objection—though, from what has been already shown, specious even in this case—is to be decided by experience; as to the others, there are, no doubt, few patients who would not willingly submit to a little additional pain for the chance of retaining the implicated organ. In appreciating this innovation, the wretched chance of safety afforded, even by the more complete kind of operation, as just spoken of, must be borne in mind. For my own part, I can find no recorded case of permanent recovery after amputation of the penis for unquestionable cancerous disease.

Amputation practised immediately behind, or even at a certain distance from, the glans, does not render the organ altogether unfit for the performance of its functions. In evidence of this M. Buret quotes Scultetus: in a case of alleged carcinoma treated by this surgeon, "*maximâ penis portione*, præsentibus magistris J. Pasboom et M. Klonkhuysen, exsectâ, vulnus consolidatum nec urinandi nec seminandi ullam fecit remoram, et diffractâ hastâ ipsam ausus est (æger) aggredi Helenam."

The operation of amputation of the penis does not require to be modified in any special manner, when the motive for its performance is the presence of cancerous disease, except that the section of the organ should be made at a certain distance behind the diseased parts. The apprehension of hæmorrhage induced Ruysch to recommend the removal of the organ by ligature; this mode of proceeding, lauded too by Heister and Courcelles, is banished from modern surgery.

Bibliography.—*Hey*, Practical Observations in Surgery, p. 445. *Buret*, Journal Hebdomad., tom. i. p. 377; 1828. *Lisfranc*, Mémoire sur les Cancers superficiels, ıu'on croyait être profonds; Gaz. Méd. de Paris, p. 249; 1830. *Travers*, Med. Chir. Trans., vol. xvii. p. 336; 1832.

* Syst. Chir. Hodiernæ, p. 420. 1800.

SECTION II.

VESICULÆ SEMINALES.

§ I. Among the most common chronic affections of the vesiculæ seminales ranks induration with thickening of their walls,—an induration which may be carried to such a point as to cause their tissue to creak when cut. This state some writers have erroneously spoken of as scirrhus; it is perfectly distinguishable therefrom, even by superficial examination, as I have had the opportunity, upon two occasions, of observing. J. P. Frank, many years since, figured a presumed specimen of scirrhus of these organs; the description he gives cannot be considered perfectly satisfactory.

§ II. According to Albers, true scirrhus of these organs closely resembles the same condition, as it affects the ovaries. He found one of the vesiculæ three times the natural size in the body of a man aged twenty-five, who died after removal of a scirrhous testicle: its walls creaked when divided with a knife, presented a shining, radiated surface, and the cells contained a reddish-brown matter. The pre-existence of cancer in the testicle seems to connect this condition of the vesicula with that disease,—but the description is unsatisfactory. Encephaloid sometimes occurs in this situation. In a man aged twenty-two, Albers found the cells of the left vesicle, which was somewhat enlarged, partially filled with medullary substance.

§ III. In Frank's case the bladder and prostate were scirrhous; in both of those noticed by Albers, the testicle was similarly affected. So far, therefore, the seminal vesicles have not been known to be the primary seat of the disease; but there can be little doubt that they would be more frequently found to labour under cancerous affection as a secondary state, were it the habit regularly to examine them after death. It would appear possible, that in Albers's case of encephaloid, the morbid matter may have been conveyed from the testicle to its reservoir, in the same manner as the natural secretion of the gland: such I think, at least, a fair inference from what has been observed concerning the presence of cancerous matter in the tubes of the epididymis.

§ IV. Upon the symptomatology and diagnosis of cancer of the vesiculæ seminales I have nothing to communicate. Whether spermatorrhœa, or unnaturally active sexual desire, result from their

implication remains to be proved, and may for many reasons be meanwhile reasonably doubted.*

BIBLIOGRAPHY.—*J. P. Frank*, Interpretationes Clinicæ, pars i. p. 288; Tübing. 1812. *J. F. H. Albers*, Beobachtungen auf dem Gebiete der Pathologie, Zweiter Theil, S. 95; Bonn, 1838.

SECTION III.

PROSTATE GLAND.

§ I. DR. CARSWELL ascribes the much greater frequency of hæmorrhage from the male than the female urinary organs, to the presence of the hæmatoid variety of encephaloid in the prostate:† that the disease is, absolutely speaking, frequent in the opinion of that writer, is a necessary inference from this statement. On the other hand, M. Cruveilhier has never, he affirms, seen a single example of the affection.‡ The truth is, the disease exists, but it is rare. M. Tanchou's tables give this organ a contingent of five deaths among 8289 fatal cases of cancer. I have been able to collect from different sources eight well-marked examples of the malady.

§ II. The evidence respecting the occurrence of true scirrhus of the prostate is defective. Beling, in a narrative extremely minute in some respects, imperfectly describes the anatomical characters of the disease, which had converted the prostate "into a perfectly degenerated carcinomatous sac, as large as the clenched fist." Mr. Travers mentions his having found the organ occupied by a small tumor possessing all the characters of scirrhus; he has likewise met with instances in which the stony hardness and enlargement

* The constitutional state of such sufferers is but little favourable to the development of undue energy in any of their functions. I am aware it has been held that in phthisis the sexual passion undergoes, in the male at least, increase; but I believe this to be a mere popular delusion. M. Louis (Rech. sur la Phthisie, 2ème éd. p. 333, Paris, 1843; or Walshe's Translation, p. 278,) has shown the truth to be more consonant with reason; and having myself within the last few years questioned numerous phthisical patients on the point, I can affirm that decline and loss of both inclination and power are the usual concomitants of advancing phthisis. Albers, assuming the "frequent" existence of increased activity established, accounts for it by the influence of tuberculisation in the vesiculæ seminales. (Op. cit. p. 73.) But Louis found these parts tuberculous in but three of forty subjects. (Op. cit. p. 134.)

† Pathological Anatomy, Fasciculus Hæmorrhage.

‡ Anat. Pathologique, Livr. xxx.

of the gland, the bloody seminal discharge, and the peculiar pains felt in the thighs and elsewhere, seemed to leave no doubt of its being the seat of that form of cancer. Sir B. Brodie relates two cases of presumed scirrhus of this organ. "There was a constant and severe pain referred to the neck of the bladder, which was not relieved on the urine being drawn off. The urine deposited a considerable quantity of adhesive mucus, and was of an ammoniacal odour." This, be it observed, is mere evidence of the existence of chronic cystitis. "The prostate was found, on examination, to be much enlarged, and of a stony hardness. The patient complained of excruciating pains in different parts of the body, which could be compared to nothing except the pains under which persons afflicted with carcinoma occasionally labour. He subsequently suddenly became hemiplegic, and died in a fortnight." The last circumstance is exactly similar to what was observed in a case referred to from the same author, under the head of Cancer of the Breast, and depended, as he plausibly conjectures, on the same cause.

§ III. In all satisfactorily described cases of prostatic cancer the disease exhibited the characters of encephaloid. Langstaff found an encephaloid growth as large as an orange, springing mainly from the middle lobe of the gland; it had occasioned absorption of enough of the mucous coat of the bladder to allow the mass to protrude into the cavity of that organ, and had extended laterally, completely plugging up the orifices of both ureters: the urethra was nearly closed also. M. Mercier met with a prostate gland, as large as an ostrich's egg, exhibiting in the most marked manner the properties of soft encephaloid; effusion of blood had taken place into both lobes, and produced cavities, communicating with each other, with the bladder, and (one of them) by a false passage with the urethra. In a boy, aged five, Mr. Stafford found the prostate of globular form, and as bulky as the largest walnut; the middle lobe was nearly as large as a small hazel-nut (about the natural size of the entire gland in an individual of this age). The section of one lateral lobe exhibited the colour, consistence, and texture of encephaloid, mixed partially with melanic colouring matter. M. Civiale also relates two cases of encephaloid disease of this organ.

§ IV. From the sources of information now referred to, it appears that cancer affects the prostate as a distinct tumor, or infiltrates the organ more or less extensively. The size of the mass thus produced may, as the descriptions show, be very considerable. All three lobes of the gland appear prone to suffer from the dis-

ease; the middle is almost always mentioned as having been specially implicated.

§ V. Ulceration and formation of fungous masses advance in the usual way; Mr. Stafford's case shows that, in the child at least, death may occur from disturbance of the urinary functions, before abrasion of the surface has taken place. The disease extends in some cases to the neighbouring parts. In that observed by M. Mercier the adjoining walls of the bladder were cancerous, and the prostatic portion of the urethra reduced to a soft pulp. On the other hand (as in a case recorded by M. Civiale) the bladder may be perfectly healthy close to the prostate, while the prostatic division of the urethra has undergone destruction. The bladder sometimes contains a calculus, of the uric acid or oxalate of lime varieties. The walls of the organ are commonly hypertrophous.

§ VI. The kidneys have sometimes been found hypertrophous, sometimes the seat of purulent infiltration, and the ureters immensely distended. The immediate connexion of these states with obstruction of the vesical orifice of the ureters is shown by cases such as Beling's, where one kidney and one ureter only have undergone morbid change, and the corresponding orifice been alone obstructed. I find no instance of cancerous affection of the kidney coexisting with that of the prostate. In Mr. Stafford's case the other abdominal and the thoracic viscera were healthy; in that of Langstaff the lung and liver contained encephaloid growths.

§ VII. In all cases on record, except that of Mr. Stafford, cancer of the prostate has proved a disease of advanced life. Like the kidney, the gland may, it appears from the instance in question, become cancerous in subjects of the tenderest years.

§ VIII. The duration of life after the outbreak of symptoms in these cases has varied between a few months and several years.

§ IX. The ordinary symptoms of enlargement of the prostate exist in the early period of the disease. The urine is passed with difficulty, in some cases *guttatim;* the calls are frequent, and the exertions made to force away the contents of the bladder powerful, occasionally productive of spasmodic action in the abdominal muscles, and attended with sense of tension and dull pain in the kidneys. Complete retention may occur, as in the child observed by Mr. Stafford; and the bladder continue incapable of emptying itself after catheterism. Even in cases where the substance of the prostate has been extensively destroyed by ulceration, and the physical obstruction to the egress of the urine thus apparently re-

moved, difficult micturition is an invariable symptom. And in connexion with this point I may observe, that in one of M. Civiale's cases, where the neck of the bladder was almost completely destroyed, incontinence of urine was not suffered from.

The characters of the urine may at this period be perfectly natural, but, after ulceration has set in, they become variously altered. Pus and blood are mingled with the fluid, and hæmaturia may become a most obstinate symptom. An aged patient, observed by M. Mercier, passed a turbid fluid, which, towards the close of life, acquired a blackish tint.

The amount of pain varies. Mr. Stafford's patient, whose cancer was unulcerated, complained of none ; Mr. Langstaff's had for six months laboured under most excruciating pain in the bladder and kidneys. Here, too, the rectum was supposed by the patient to be the seat of pain ; pressure of the enlarged gland had produced obstruction of that part of the bowel. The suffering undergone will be even unusually severe, where calculus coexists with the prostatic disease.

The state of the seminal discharge in these cases has not been carefully inquired into ; Mr. Travers has, it appears, known it to be bloody.

Previously to ulceration, the constitutional symptoms may be simply those depending on urinary obstruction,—restlessness, irritability, anxious countenance, furred tongue, fever, &c. Subsequently a cachectic state sets in.

§ X. In the child treated by Mr. Stafford, the disease proved fatal from its mechanical influence on the urinary functions alone, in the course of some three or four months. Subjects of more advanced age resist such influence more effectually, and, after lengthened sufferings, die cachectic. Certain accidental circumstances may hasten the fatal issue : in Mr. Langstaff's case, death was immediately caused by rupture of the right ureter, and effusion of three pints of urine and blood behind the peritonæum.

§ XI. Examination with the catheter and the finger *per rectum*, coupled with consideration of the symptoms, will commonly render the existence of prostatic tumor matter of certainty. Previously to the occurrence of ulceration it will be next to impossible to determine the nature of the enlargement. Severe pain and hæmaturia will facilitate the diagnosis afterwards. But even the most experienced persons have been much deceived as to the amount of disease present.

§ XII. The treatment must be purely palliative; and the best

palliation is afforded by the carefully managed use of the catheter, especially of the elastic-gum kind. In cases of total retention, puncture of the bladder might become necessary; the operation above the pubes is probably the one to be preferred. M. Cruveilhier is a strong advocate, in cases of retention from simple hypertrophy of the prostate, for forcing a false passage through the gland,—or, as he terms it, puncturing the bladder through the prostate. The operation appears unscientific and dangerous under all circumstances; but even its deviser would doubtless shrink from recommending it, where the organ was cancerous. Experience shows, indeed, that great caution and delicacy are required, even in introducing the catheter into the bladder in the ordinary way, from the fear of wounding the vascular productions of the new substance. A person with diseased prostate, and in the habit of introducing the catheter himself, observed one night that blood flowed with the urine. Shortly after, Sir B. Brodie found that the bladder was distended with blood: cupping the loins and other treatment stayed the hæmorrhage, but not till a great quantity of blood had been lost. In the course of two or three weeks, the urine had recovered its clearness; but the patient only survived the accident a month. A large tumor of the prostate was discovered projecting into the bladder; and the spot appeared visible, where its vessels had given way.

Bibliography.— *Langstaff*, Medico-Chirurg. Trans., vol. viii.; 1817. *Beling*, Carcinomatöse Degeneration der Vorsteherdrüse, in Horn, Nasse, Henke, und Wagner's Archiv., Bd. i. S. 443; 1822. *Travers*, Med. Chir. Trans., vol. xvii. p. 346; 1832. *Howship*, Med. Chir. Trans., vol. xix. p. 41; 1835. *Brodie*, Diseases of Urinary Organs, 2nd edit. p. 161. *Stafford*, Med. Chir. Trans., vol. xxii. p. 218; 1839. *Civiale*, Malad. des Organes Génito-Urin., tom. ii. p. 444; 1841.

SECTION IV.

TESTICLE AND EPIDIDYMIS.

§ I. The testicle is one of the more common seats of cancer in the male. While Bayle obviously exaggerated in affirming that it is almost as frequent in man as mammary cancer in woman, that so low a proportion as 21 of 8289 deaths from the disease should be assigned to this organ in the Paris Registers, affords ground for surprise. Among diseases causing enlargement of the proper substance of the testis (generically termed sarcocele) cancer is, with a single exception, the most frequent.

§ II. Cancer of the testicle occurs as the solitary evidence of the

diathesis, more frequently than in association with other cancers. In almost all instances the disease is primary in this organ. Of consecutive implication of the testis, when the primary disease occupied a distant organ, I have met but one (p. 339) instance; propagation of cancerous infiltration from the scrotum sometimes occurs.

§ III. True scirrhus of the testis is extremely uncommon. Astley Cooper (the only writer, as far as I know, who distinctly avers that he has seen the disease) describes it in terms which leave his readers in complete doubt as to its real characters. His details will apply to fibrous, or even to enchondromatous formation, in regard of structure; while the affection of the abdominal glands and cord, and the rapidly fatal effects of operation in his cases, bespeak apparently some variety of carcinoma. It is certain that the solid, chondroid, semi-transparent scirrhus of other sites is but rarely witnessed in this organ. M. Roux* speaks in a recent publication as though the state were common, but admits that cerebriform substance is almost always associated with the scirrhous structure.

Cruveilhier describes,† under the title of pearly alveolar cancer, a growth of this organ, composed of an areolar stroma of fibrous consistence, the alveoli being filled with matters of various kinds, the most remarkable among them a pearly semi-transparent substance easily removeable. I doubt whether this can be considered a variety of colloid cancer, and am rather disposed to believe with Müller, that these pearly nodules were composed of cholesteatomatous matter: the basis of the growth, however, must have been cancerous; some vertebræ and ribs contained encephaloid tumors.

Encephaloid is as common as the two other species of cancer are rare. It exhibits itself chiefly in the proper encephaloid, milt-like, and hæmatoid varieties; and may, practically speaking, be considered to represent the genus cancer in this organ.

§ IV. The testis is one of those structures in which (especially when the morbid growth attains large bulk) peculiar appearances, giving the mass the characters of a composite tumor, are most commonly noticed. Here yellow discoloration is very frequently observed; and, as in the kidney, ascribed by writers generally to association of tuberculous matter. Such supposed tuberculous matter has appeared to me (in the few instances I have seen justifying an opinion) to be softened fibrin; an opinion I am the more strongly disposed to adhere to, from finding Mr. Curling in-

* Dict. de Médecine, 2e édit. tom. xxix. p. 507. Paris, 1844.

† Anatomie Pathologique, Livraison v. art. Sarcocèle.

sist in his valuable work* on the occasional appearance of "small depositions of yellow fibrine" in these tumors.

§ V. Both testicles are prone to the disease; it was formerly taught by Fabricius that the right was the more commonly attacked. I have not met with any example of implication of both testes in the same individual, either simultaneous or at different periods.

§ VI. The body of the testis is unquestionably the portion of the organ first affected in the great majority of cases; but in rare instances the epididymis suffers earliest.

§ VII. Opportunities rarely occur of examining the testis, when its structure is first invaded by the disease. Cruveilhier holds that proper infiltration does not take place; but that a central or peripheric nodule or nodules, gradually enlarging, drive aside the glandular structure, eventually causing its atrophous destruction. Were this doctrine well founded, a remnant of testicle ought *always* to continue discoverable by careful examination on the confines of the diseased mass,—at least in cases of moderate enlargement: now this (though a frequent) is by no means an invariable appearance. It is certain, on the contrary, that, at a comparatively early period, the proper lobules of the testicle may be replaced by encephaloid substance.

In the absence of direct investigation of the point, it seems fair, upon general analogy, to assume that the intervascular interstices of the gland are the primary seats of formation. I know of no observation bearing upon the state of the vessels or seminiferous tubes at an early period. Mr. Curling ascertained in one instance, that "the canals at the head of the epididymis (the only part of the gland not destroyed) were distinctly filled with a white matter, which on examination proved to be carcinomatous." This can only be considered a result of the capillary attraction of the tubes.

§ VIII. Some writers state, that diminution of bulk occasionally coexists at the outset with formation of cancer in the testis: such cases, if really ever witnessed,† must be singularly rare; indeed, the fact is scarcely intelligible. From the first, the dimensions of the organ gradually increase in the ordinary course of events, until the tunica albuginea has undergone the extreme limit of distension. A period then ensues during which the volume of the part remains stationary; the eventual rupture of that tunic permits further enlargement.

* On Diseases of the Testis, p. 339. Such deposits of fibrin occur distinctly in renal cancer also.

† A case related by Boyer seems to render the possibility of the state certain.

§ IX. The changes occurring in the cancerous structure itself are those witnessed in other parts. When the tunica albuginea gives way, which it may do in one place only, or in two or more spots simultaneously, the growth sprouts out, and eventually distends the scrotum to a very considerable amount. In a model now before me of a mass removed in University College Hospital, the bulk of the part is not less than that of the fœtal head.

§ X. Ulceration of the investing scrotum is slow to occur in encephaloid disease of the testicle. This fact, admitted by all writers, (with the exception, perhaps, of Sir Astley Cooper,) seems readily explicable by the laxity of the skin and cellular membrane of the scrotum. These tissues are so distensible, and besides so loosely connected with the testicle itself, that time sufficient may have elapsed to give the tumor great dimensions, and to admit of implication of distant organs (deep and extensive enough to prove the actual cause of death) taking place, before marked tension, attenuation, or other changes in those integumentary structures, shall have arisen.

Mr. Curling has shown that the tubes of the epididymis may contain cancerous matter; and it appears probable that, in a case I have already (p. 413) referred to, encephaloid substance was conveyed from the testis to the vesicula seminalis through the vas deferens. The state of these structures has not otherwise been properly investigated.

The tunica vaginalis becomes early diseased in almost all cases. Simple serous effusion, effusion of plastic blastema, leading to thickening of the coats of the sac, and formation of adhesions, with abundant formation of new vessels on the attached surface of the visceral and free laminæ of the membrane, are the most common appearances. Nor is it by any means rare to find cysts (sessile or pedunculated) within the cavity of the sac, and filled with semi-transparent, yellowish, and slightly gelatiniform serosity.

The arteries of the cord undergo great enlargement, where the diseased mass has acquired considerable bulk. Various observers have found the spermatic artery as large as the radial artery at the wrist. The subcutaneous veins exhibit the usual dilatation.

The communicating lymphatic system invariably suffers sooner or later: the lumbar glands most commonly, the inguinal less frequently. It is a received opinion, indeed, that the inguinal glands do not enlarge until ulceration has taken place, or is, at least, upon the point of occurring. Some observers, on the contrary, hold

that this class of glands is usually affected, even at an early period of the disease. Both opinions are incorrect, if taken in their extreme sense. Abernethy* describes ulceration of the inguinal integuments following enlargement of the glands, in a case where the scrotum continued unimplicated; and Mr. Curling has seen them affected before any appearance of disease in the latter part. The lumbar and aortic glands sometimes undergo great enlargement, and form tumors readily discoverable during life by manual examination of the abdomen. The aorta and descending cava may be so pressed upon and detruded by these enlarged glands, that the circulation within them becomes materially impeded.

The lungs, liver, kidneys, brain, meninges, bones, especially those of the spine, the mesenteric glands, vena cava, and heart, are among the observed seats of secondary cancer, the testis being its primary nidus. The brain and spine are perhaps implicated with slightly greater proportional frequency, than when the primary disease is originally localized in other organs.

§ XI. Encephaloid cancer occurs in the testis of persons of all ages. Langstaff observed the disease in a child ten months old, and it has been seen in men aged sixty, seventy, and upwards even. As far as I have been able to ascertain, the general law respecting age applies to medullary cancer of the testicle. External violence is, perhaps, more frequently traceable as an exciting cause of cancer of this organ, in predisposed persons, than of any other part of the frame. Indulgence in horse-exercise should, as a measure of precaution, be avoided by persons of cancerous descent.

§ XII. In no organ is the duration of encephaloid disease more variable. A few months sometimes carry the patient to the grave; while, on the other hand, several years (so many as fourteen have been observed) may intervene between the occurrence of the first symptoms and the fatal event.

§ XIII. The patient's attention is commonly first attracted to the part by increase of size,—a change of bulk accompanied generally with slight pain, recurring from time to time, in the organ itself, as well as with a dragging sensation in the cord. The testicle, at this early period, appears harder than its fellow,—not uniformly so, but in some particular point. By degrees the hardness becomes general, and the weight of the gland obviously increases more than in proportion to its augmented bulk. The parts are generally in this condition when the patient first seeks advice,—

* Observations on Tumors, p. 52.

the epididymis still remaining free, or having already shared somewhat in the diseased induration. The form of the organ is still ovoid, the surface smooth; nor will pressure (as far as permissible) now discover any difference in consistence in different parts of the enlarged gland. Hydrocele to a slight amount may exist in this stage. The cord exhibits its natural characters.

After a variable period, the form of the gland commonly changes; it inclines more or less to the spherical shape; still the ovoid outline may be retained in masses of large size (University College Museum). In cases of excessive enlargement the form appears always to become spheroidal. The smoothness of surface is exchanged for a state of inequality and tuberousness. The uniform solidity and hardness of the organ give place to that irregular hardness and softness, combined with elasticity, characteristic of encephaloid,—the growth has now made its way through the tunica albuginea, and its proper characters consequently become perceptible. The size of the mass at its full development commonly averages that of a clenched fist; but much larger dimensions are witnessed.

Meanwhile, pain becomes more constant and acute, and extends to the loins; the cord enlarges, and grows knotty from irregular distension of its vessels. The scrotal vessels, as the mass expands in bulk, become similarly distended; the skin grows adherent to the mass, attenuates, and in some cases undergoes ulceration in one or more spots, whence spring bleeding, fungous growths. I have already sufficiently dwelt upon the comparative rarity of ulceration in cancer of the testis.

The general symptoms run the ordinary course.

§ XIV. *Simple hypertrophy* is distinguishable by its commonly affecting both testicles; the enlarged glands retain their natural properties in every respect,—their form, smoothness, peculiar elasticity, and sensibility remain unchanged; the condition, which cannot be termed a disease, is said to occur most commonly in natives of tropical climates, and between the ages of eighteen and twenty-three.—*Simple chronic induration* commonly implicates one testicle only, and in some cases distinctly affects certain parts only of the gland; the surface is often uneven, and the part painful. This assemblage of characters is sufficient to show the difficulty of distinguishing such induration from that produced by cancerous disease, so long as the bulk of the testicle is not much increased. Fortunately, a means of diagnosis exists in the difference of effects produced in the two diseases by mercurial treatment; such treat-

ment very commonly produces a favourable effect upon the simple induration, while it is utterly inefficacious in cases of cancerous enlargement.—*Syphilitic induration* is accompanied with dull pain, sometimes sufficiently sharp, but never lancinating, and generally more troublesome by night than in the day: the organ, though sometimes increased, is not unfrequently diminished, in bulk, and as it were wrinkled; its investments retain their natural characters; the density of the gland increases, and it loses its natural suppleness and elasticity; the epididymis and testicle are not so clearly distinguishable as in the healthy state. These characters (the enumeration of which I have borrowed from M. Velpeau) will commonly suffice, taken in connexion with the history of the patient, and the influence of anti-syphilitic treatment, to prevent confusion with cancerous disease.—*Tuberculous* (scrofulous) *disease* scarcely occurs except in persons whose lungs contain tubercles;* the state of these organs will, consequently, afford some aid in the diagnosis. Should the disease have reached the stage of ulceration, with discharge of scrofulous pus and formation of sinuses, no difficulty can arise in its discrimination. And, on the other hand, when an encephaloid mass has attained much bulk, it cannot for a moment be confounded with tuberculous disease. Again, in the acute inflammatory changes, sometimes associated with the latter affection, there is a ready source of distinction. In the chronic unulcerated state, the smaller bulk of the part, its more distinctly nodular character, and its extremely slow progress, will help the observer to the diagnosis of the tuberculous, from the cancerous, testicle.—*Fibrous tumor*, with atrophy of the testicle, is of excessively rare occurrence; the only cases I know of, are, one observed by Sir B. Brodie, and another already referred to as having been delineated by M. Cruveilhier.† Total absence of pain and constitutional sympathy, taken in conjunction with the excessive weight of the part in proportion to its bulk, may, it is presumable from these cases, prove of some utility in the diagnosis; but obviously they are insufficient to justify a decisive opinion.

Cystoid and cysto-sarcomatous growths in the testicle are fre-

* The tables, supplied by purely *medical* observers, illustrative of the frequency of tubercle in different organs, cannot be referred to in elucidation of this point, as they almost invariably omit all mention of the testes.

† Mr. Curling (op. cit. p. 77), in a case of imperfect descent of the testis, found the gland little more than half the usual size, and evidently in a state of fibrous transformation; but such cases are obviously not *practically* connected with those referred to in the text.

quently as difficult to distinguish from encephaloid cancer by their physical characters during life, as they are in reality both structurally and pathologically distinct therefrom. The importance of a correct diagnosis is obvious, as extirpation will completely cure the cystoid disease. The progress of this affection is slower than of encephaloid, it is not productive of pain, the constitution does not suffer, nor do the communicating lymphatic glands undergo enlargement; the cord remains unaffected, and the tumor itself is more uniformly hard, and more even on the surface than the encephaloid. — Of *enchondroma* the distinctive characters cannot, as matters of experience, be detailed; they must doubtless correspond closely with those of cystoid masses.—*Hydrocele* is distinguishable by the regular advancement of the swelling from below upwards, by the comparative lightness of the mass, by its transparency (unless there be much thickening of the tunica vaginalis), by the even surface of the enlargement, by its pyramidal form (when, as is usual, this exists). The presence of lymphatic enlargement will signify that the disease is not simple hydrocele; but its absence is not sufficient evidence of a mass not being encephaloid.—*Hæmatocele* is referred by the patient to severe local injury; the mass appears, and acquires its full size, suddenly,—once formed remaining stationary for a considerable period; fluctuation exists; the amount of resistance felt on examination is equal at all parts. But clear as these marks may seem in description, they sometimes fail at the bed-side; nor should exploratory punctures, satisfactory though they may prove in respect of diagnosis, be lightly undertaken: they are not without their detrimental effects in cases of encephaloid disease. I would refer the reader to Mr. Curling's volume (p. 348), for an excellent illustration of the difficulties sometimes attending the diagnosis of these cases.

§ XV. The internal use of the iodide of arsenic, combined with local inunction of the iodide of lead ointment, has never yet been tried on a sufficiently extended scale to warrant a decisive opinion as to its powers in controlling the advance of the disease. Compression, on Dr. Arnott's slack air-cushion plan, most unquestionably deserves full trial.

What can be said of the propriety of removing the diseased organ with the knife? M. Roux* tells us, that the only contraindications to the operation arise from great local extension of the disease, the existence of lymphatic or visceral contamination, and a

* Dict. de Médecine, 2ème édit. art. Testicule.

cachectic state of the system. He tells us, that though the tumor be of very large dimensions, and adherent to the urethra and corpus cavernosum; though the skin be ulcerated; and though the disease affect the cord, provided it have not reached beyond the lower opening of the inguinal canal; though all this exist,—still should the extirpation of the morbid mass be effected! Does experience give warranty to such recommendations? Unquestionably not. Scarcely an organ in the frame exhibits such lamentable results as the testicle, in respect of the eventual failure of operations for the cure of its cancerous diseases. Sir Astley Cooper records five cases, in *all* of which the disease returned; he has spoken of *no single* instance of cure.—Sir B. Brodie has known but one case in which recovery ensued; and the patient in this instance had not been seen at a later period than between three and four years after the operation. — Mr. Travers has "never known an instance of the non-recurrence of the disease after castration." In one case, which he relates, the health was only moderately affected; and the patient expired on the twelfth day after the operation. Mr. Samuel Cooper,* having commented on the fact that "some surgeons of great experience have not known one instance of a permanent cure," relates some of the particulars of a case (in which he had operated himself), wherein the disease had not returned three years after the operation: this is obviously, from the context, the strongest case in favour of operation which Mr. Cooper's experience has supplied him with.—Dr. Warren† describes three cases, in which death occurred on the fourteenth and seventeenth days, and in the seventh week, after operation; guardedly alludes to others, in which "the wounds healed, and the patients recovered, and continued well, *so far as we know*;" but makes no reference to his having ever even heard of a permanently successful case.—Mr. Curling (as is inferrible from his volume) has never either seen, or known of, an instance of permanent recovery.

From all this the inference is clear and absolute, that the cure of cancerous affection of the testicle by extirpation, no matter at what period of the disease it be effected, is a matter of, at the least, utter improbability. Nor are there any facts or experiences on record even tending to show that the mean duration of life is prolonged by its performance, while numerous individual instances can be referred to, proving that it may bring life to an abrupt and unexpected close.

* First Lines of Surgery, 7th edition, p. 587. 1840.

† On Tumors, p. 330.

Under these circumstances, is it justifiable to persist in the habit of extirpating the organ? Mr. Quain informs me, that (so long as the general health is unimpaired, and there is no evidence of existence of disease beyond the testis,) he advises the operation: "because he has not facts to show that the unfavourable issue is generally accelerated by the operation;—because it is not certain that the removal of the testis does not delay in *suitable* cases the progress of the disease;—and because the patient suffers much inconvenience from the weight and bulk of the tumor in the part; while, if his life be not prolonged, it is rendered less miserable for a time at least." I attach deep importance to any views emanating from Mr. Quain; but I cannot avoid thinking that the expediency of the arguments, he adduces, may be contested on the general grounds taken in a former part of this work (pp. 244-6). And I would venture to observe, that, though it be perfectly easy to distinguish *unsuitable* cases for operation, it must, to all seeming, prove a point of insurmountable difficulty to determine those which are *suitable*,—in as much as death has very speedily followed the use of the knife, when the general health was unimpaired, the tumor small, the skin free from morbid change, and the cord unaffected.

SECTION V.

TUNICA VAGINALIS.

The formation of a cancerous tumor within the proper cavity of the tunica vaginalis is a phenomenon of, at the least, excessively rare occurrence. The only case I know of, having any fair claim to be considered of this kind, is recorded by Sir A. Cooper.* A man, aged sixty, had a hard swelling on the left side of the scrotum, accompanied with some effusion into the tunica vaginalis. The fluid was drawn off more than once, the solid substance increasing after each puncture. Eventually the mass was removed: the testis was perfectly sound, and the *cavity* of the tunica vaginalis filled with a "spongy effusion", which had all the characters of "incipient fungus".

Further observations upon this form of disease are manifestly wanting.

* On Diseases of the Testis.

GENITAL ORGANS OF THE FEMALE.

SECTION I.

VULVA AND LABIA EXTERNA.

§ I. Dr. Stedman* describes a tumor which had been growing for five years in the right labium of a woman of colour, was the seat of stinging pain and ulceration, and discharged a very fœtid matter. The patient was a good deal reduced. The growth was, on removal, ascertained to weigh twelve ounces and a half, and "to exhibit the true scirrhous character on section." In the Museum of University College is a preparation (No. 2197) of cancer of the left labium, extending round the clitoris to the right side.

The skin of the vulva sometimes gives origin to cancerous excrescences, which run the same course as in other parts of the surface. In certain cases scirrhous infiltration of the skin is so trifling in extent that the disease appears to commence by ulceration. In this form, as Mr. Heming remarks, it is with difficulty distinguished from a venereal sore. "The chief diagnostic symptoms," says this practitioner, "may perhaps be found in the general affection of the surrounding sebaceous glands, giving the skin an appearance as if studded with tubercles, about the size of split peas." Inoculation of the secreted fluids might probably settle the question. In a case of this kind observed by Mr. Heming, "the carcinomatous affection had extended up the vagina to about two-thirds of its length; the uterus and ovaria were not at all affected; the liver had in its substance, particularly towards its surface, about twenty small tumors of a carcinomatous appearance, and both kidneys were affected with the same disease."†

§ II. The contact of urine, and of the fluid secretions (often of an irritating character) of the mucous membrane of the genital organs, and the friction undergone by the parts during walking and coitus, are stated to be the common exciting causes of the disease. Admitting their influence, it is obvious that, as they exist in almost all women, that influence can be of extremely slight importance.

§ III. The excision of the diseased parts (if it be judged advisable to have recourse to this) is usually an operation of extreme

* Ed. Med. and Surg. Journ., vol. xxxvii. p. 25.

† Translation of Boivin and Dugès on Diseases of the Uterus, p. 544. Lond. 1834.

simplicity; and, according to Bégin, the greater portion of the external genitals has been removed without entailing serious inconvenience or obstruction of function. But the presence of an intricate and extensive vascular plexus under the vaginal surface renders it a difficult matter in some cases to stop the hæmorrhage which follows: plugging the vagina with lint steeped in some styptic solution, and covering the external parts with compresses similarly saturated—the whole being retained *in situ* with a T-bandage—is the best mode of arresting it. The bladder should be regularly emptied with the catheter for some time.

Dr. Stedman encompassed the tumor above referred to with two semilunar incisions, and then rapidly dissected it out. Four small arterial branches only required to be tied; the wound was brought together with five stitches of interrupted suture. Five months after, there had been no return of the disease: but this fact obviously allows of no inference as to the ultimate fate of the patient.

SECTION II.

CLITORIS AND NYMPHÆ.

§ I. These appendages may become the seat of cancer either primarily; by continuity with deeply-seated parts; or consecutively to the development of carcinoma of the uterus.

§ II. Boivin and Dugès relate the case of a female, ætat. 34, in whom "the clitoris, of the size of the little finger, had acquired this volume from the serous infiltration of its external investment; its proper tissue was scirrhous." Mr. Travers has also "known the clitoris the subject of scirrhous ulceration, and freely amputated." Schoenfeld * removed the clitoris and nymphæ, forming a tumor weighing three ounces; the mass was not of fibrous texture, but formed of a whitish substance, smooth, of almost cartilaginous hardness, and traversed by a multitude of capillaries visible under a lens. This structure was probably firm encephaloid. A tumor, consisting of a white softish clustered mass, as large as the clenched hand, was once found by Boivin and Dugès suspended to the clitoris and nymphæ, by a pedicle of the dimensions of the little finger. After death its component lobules were ascertained to possess the appearance and consistence of encephaloid. One of the most remarkable cases of this kind on record is described by Mr.

* L'Expérience, Sept. 5, 1838.

Brayne.* The tumor in this instance weighed *in situ* (as nearly as could be ascertained) eleven pounds; and its external appearance, the frequent and violent hæmorrhages and lancinating pains of which it was the seat, as well as the general course of the symptoms to which it gave rise, leave little doubt as to its carcinomatous nature, though, as the narrative does not extend to the patient's death, we are left in ignorance of the precise characters of its component tissue. A very interesting example of carcinoma of the external genitals, which coexisted with cancerous products in numerous other parts, has been related by Dr. Ashwell:† the female was pregnant when observed.

§ III. Excision of the diseased parts is uniformly recommended by authors; and the necessity of early operation insisted upon. The dissection of the clitoris may, if necessary, be pursued as far as the insertion of the corpora cavernosa into the rami of the ischia. If the uterus be diseased, the operation is utterly inadmissible with a curative intention; and whether permanent recovery ever ensues under any circumstances, may fairly be doubted. According to Dr. Ashwell's experience (Diseases peculiar to Women, p. 710), the disease always speedily reappears.

SECTION III.

VAGINA.

The deep-seated portion of the vagina is, in rare instances, found to be the seat of cancerous disease, independently of extension from the uterus or rectum. Fourteen of 8289 deaths from cancer are ascribed in the Paris Registers to affection of this part; but no distinction is made whereby it may be ascertained in how many instances the disease was primary. Dr. Mason Warren, of Boston, recently told me that isolated cancer of the vagina is far from very rare in his neighbourhood in the United States.

Mr. Ferrall‡ some time since exhibited a specimen of cancer to the Pathological Society of Dublin, in which the vagina was the chief seat of ulceration, the uterus (with the exception of the os tincæ, to which the ulcerative process had extended) exhibiting no marks of disease. Continuous with the cancerous surface was a large encephaloid tumor, which penetrated the roof of the vagina

* Prov. Med. and Surg. Trans., vol. iv. p. 369. 1839.

† Guy's Hosp. Reports, vol. ii. p. 247.

‡ Dublin Journal, p. 335. Nov. 1839.

and entered the bladder, forming a large fungous mass in its interior. The patient died of exhaustion from repeated vaginal hæmorrhage.

SECTION IV.

OVARIES.

§ I. I FORMERLY noticed the errors, of precisely opposite kinds, into which certain writers had fallen respecting the frequency of cancerous disease of the ovary, — that of Payle, who almost questioned its ever occurring; that of Boivin and Dugès, who exaggerated its frequency to such a degree as to consider it more common than cancer of the mamma. That ovarian cancer is far from being a very rare affection, my own experience would suffice to convince me; and the tables of M. Tanchou, in giving a share of 64 deaths among 8289 to the disease, supply some idea of the amount to which it proves destructive of life.

§ II. Cancerous structure forms in the ovary: (*a.*) as the primary evidence of cancerous disease; (*b.*) as an extension of a similar morbid state in the uterus; (*c.*) independently of (that is, as regards continuity), but subsequently to, the development of carcinoma in the latter organ; (*d.*) consecutively to the growth of cancer in distant and unconnected parts. I believe, with Cruveilhier, that the latter mode of implication of this organ is rare; though not so to the extent he imagined.

§ III. Scirrhus and encephaloid, both tuberiform and infiltrated, occur in the ovary. I have neither myself observed colloid cancer in this situation, nor met with any faithful description proving that other observers have been more successful. The statements of Cruveilhier upon this point are to be understood to refer to multilocular cystoid tumors. Encephaloid is more common than scirrhus, and exhibits itself under all varieties of aspect, — being, for example, not unfrequently the seat of deposition of dark brown or black (melanic) colouring matter. I have seen both ovaries converted into masses of the solanoid variety of encephaloid, each of the size of a hen's egg: all trace of the proper structure of the ovary had disappeared. The University College Collection (No. 2231) contains a specimen of encephaloid masses as large as the clenched hand in both ovaries.

§ IV. The carcinomatous affection may be the sole morbid state of the ovary. When this is the case, and when the morbid production affects the tuberiform character, the substance of the ovary

may sometimes be found, on the external surface of the adventitious mass, either of the natural dimensions or in an atrophous state. When the morbid matter is infiltrated through the ovarian tissue, the vesicles of de Graaf may retain the natural appearance, according to Bouillaud: occasionally, as in one of Dr. Bright's cases, the deposition appears to originate in the wall of one of those vesicles.

But cancerous matter, especially when encephaloid, is (to judge from what I have myself seen, as well as from recorded cases,) more commonly discovered in the ovary, as an addition to some other morbid formation, than as the sole disease of the organ: multilocular cystoid productions are those to which it is most frequently superadded; in much more rare instances, a unilocular cyst preexists. Under such circumstances the cancerous deposition goes on in connexion with the walls of the cysts, and exhibits all the varieties of pedunculated and sessile form. When thus formed in the walls of cysts, encephaloid frequently coexists with fibrous, cartilaginiform, calcareous, or ossiform infiltration of those walls. It is important here to caution young observers against an error committed in numerous cases, in which diseased formations consisting simply of cysts, of which the walls had been converted into fibrous tissue, have been erroneously described as true scirrhus of the ovary.

§ V. Encephaloid growths vary in size in this organ, from that of a pin's head, (as I have detected them under the serous lining of cysts,) to that of the fœtal head, or upwards. They are rarely, however, observed to attain very large dimensions here, unless when developed in the walls of cysts; under these circumstances, the entire formation has been known to weigh fifty-six, sixty, and seventy-five pounds, or even more. Dr. Warren describes the removal of a "scirrhous ovarium, of almost cartilaginous hardness, containing neither cavity nor fluid, which weighed about twenty-five pounds." It may be objected to this statement, however, that no proof is given of the truly scirrhous character of the growth; and its very size supplies, in my mind, a fair motive for believing it not to have been so.

§ VI. Dr. Seymour conceives he has ascertained that scirrhus of the ovary rarely softens, and refers to a preparation in the College of Physicians as a very singular specimen of such change: this statement is in all probability to be understood to have relation rather to fibrous than really scirrhous growths. Encephaloid softens in this organ in the ordinary way.

§ VII. The disease is usually confined to one ovary, though both are not unfrequently implicated. I have not been able to discover that either organ is, to any marked amount, more prone to suffer from cancer than its fellow,—though any difference that exists, shows the disease to be most common in the right.

§ VIII. The morbid mass contracts adhesions with surrounding parts in many cases; but in what exact proportion of the whole number is yet matter for inquiry. Nor are the circumstances which cause the inflammatory exudation-matter, constituting these adhesions, to be thrown out, always traceable; they are extensive in some cases, where all symptoms of peritonæal irritation had been deficient,—a fact of obvious practical importance. Be this as it may, if adhesions form in an early stage of its growth, they connect the morbid mass with the uterus, rectum, or pelvic peritonæum; if at a later period, with the omentum, colon, small intestine, or abdominal portion of the serous membrane. The Fallopian tubes in some instances continue free, but more ordinarily become firmly united with the tumor, round which they twine, undergoing a degree of elongation corresponding to its increasing dimensions.

§ IX. Individuals dying with ovarian cancer may be free from the disease elsewhere; or other organs may be carcinomatous. The ovary escapes more frequently in cases of uterine cancer than might be anticipated: the stomach is occasionally affected with the same disease as the ovary. In a case recorded by Dr. Bright, where both ovaries were scirrhous, both mammæ, the liver, the omentum, the mesentery, the heart, the spleen, lungs, and subcutaneous cellular tissue, were similarly diseased. Fibrous tumors of the uterus are met with in some rare cases of carcinoma of the ovary. The serous cavities, peritonæal, pleural, and pericardial, not uncommonly contain a large quantity of serosity; and marks of recent peritonitis are far from unusual.

§ X. Of special causes of ovarian cancer nothing is known. Much hypothetical matter has been written on the influence of gestation, abortion, suppression of the lochia, &c.; the unsatisfactory character of such speculations may be ascertained by perusing the published histories of some dozen patients.

Comparatively young women may suffer from cancer in this organ; and even children are not exempt from all chance of the disease.* The mean age of twenty-one individuals at death I find to have been forty-one years.

* See Cancer of Pericardium, Chapter III. p. 372. See also a remarkable case

Boivin and Dugès affirm that the disease is most common in single persons. Capuron (who regards the statement as well-founded) knows not whether to ascribe the undue amount, to which unmarried persons suffer, "to continence carried to an extreme not intended by Nature, or to the dissoluteness of habits which too often prevails in the unmarried state." With regard to the latter point, it is to be remembered that prostitutes are not more frequently the victims of uterine cancer than females of regular conduct; and, as regards the original statement of Madame Boivin, there is great reason to doubt its accuracy. The affection has been most commonly observed in this country in married women, many of whom had been pregnant, some so frequently as five or six times.

§ XI. The local symptoms of ovarian cancer are functional in respect of the organ itself; mechanical in respect of the influence this exercises, when enlarged, on adjacent structures.

The ovary in a state of cancerous disease may be the seat of severe lancinating pain; but this is unquestionably rare, even when the mass has acquired large dimensions. The space afforded by the abdominal cavity for the easy enlargement of the morbid growth, and the consequent absence of constriction, may in some measure explain this. At an early period of enlargement, especially if to other morbid changes irritation be superadded, the lateral part of the pelvis may be the seat of that peculiar dull, aching pain, (probably resembling the suffering produced in the testicle by pressure,) accompanied with hysterical feel, which experience has taught observers to connect with the ovary. In a case of tumor of the abdomen, respecting which I was some months past consulted, the description of the early pain suffered by the patient attracted my attention at once to the ovary as the seat of enlargement, and subsequent examination proved this to be the organ affected. Sensations, either painful, or merely uneasy, are common in connexion with cancerous masses, as a mere consequence of pressure of the various abdominal viscera.

Such growths are not, commonly, tender under pressure; if they be particularly sensitive in this way, local peritonitis may be considered as in all probability present. In cases, however, where no pain is caused by direct pressure on the abdomen, marked tenderness may be detected by pressing upwards with the fingers placed in the vagina, while the other hand pushes the tumor downwards

of encephaloid cancer of the left ovary occurring in a girl aged twelve years, recorded by Otto in his Neue Seltene Beobachtungen, S. 143. 1824.

and forwards. But none of these pains or sensations are distinctive of cancer.

No information is derivable from the state of the catamenia. They are, generally speaking, irregular; may be wholly suppressed (as is comparatively rare, if the subject be still of an age to menstruate); or, as is still less common, continue natural in respect of quantity, quality, and periodicity. I have not myself known the latter state to exist, except where one ovary only was affected.

Conception may occur repeatedly in women, *one* of whose ovaries contains a compound cystoid mass, with superadded encephaloid deposit. There are numerous examples of the fact on record. Mr. Hewlett has, even, related the case of a female delivered at the full time, though *both* ovaries were the seat of extensive encephaloid disease: it seems doubtful whether the morbid state existed in both organs at the period of impregnation (in which case the alteration of structure must have been limited on one side), or was subsequently developed; the latter, judging from the history of the case, and the species of the cancer, was most probably the fact.*

The mechanical are the most important effects produced by these growths; yet even these are less serious, generally speaking, than might be anticipated,—a fact no doubt explicable by the gradual progress of enlargement, whereby the various organs, as likewise the abdominal walls, are prepared for the pressure, detrusion, and expansion entailed by the morbid mass.

The physician has rarely an opportunity of examining the tumor, produced by an enlarging ovary, at a very early stage of development. When the occasion does occur, this tumor discloses itself as a small rounded mass, generally somewhat lobulated and uneven on the surface, moveable, evidently separated from the uterus (as the finger in the vagina and the hand on the swelling in the inguinal region may discover),—a mass not affected by any jerking movement given to the neck of the uterus *per vaginam*. The tumor, seated in the lateral part of the pelvis, rises, as it grows, into the abdomen, gradually inclining towards the middle line; when it attains very large dimensions, it seems to fill the entire of this cavity, though inspection of the surface, aided by manual examination, will generally prove its connexion with one rather than the other side. An ovarian tumor may, with the progress of enlargement, pass from one side of the abdomen to the other, twisting the uterus round, as it changes its position.†

* Med. Chir. Trans., vol. xvii. p. 266. † Greenhow, ibid. vol. xxvii. p. 99.

Ovarian cancerous tumors, even while of moderate bulk, but more distinctly so if of large size, appear lobulated when examined through the integuments. If there be no irregularity of surface visible, still unevenness can readily be discovered by manual examination. Some parts of the mass feel as solid nodules, while in other places a more or less distinct fluctuation is detected. Peripheric fluctuation may sometimes be produced, when common fluctuation cannot be detected. The enlargement of the mass has evidently from its aspect, and also from the history given by the patient, taken place from below upwards. In advanced cases, veins of large calibre permeate the attenuated walls of the abdomen.

Percussion of these tumors discovers various amounts of dulness of sound and of resistance to the finger, corresponding with the density of their constituents in different parts. The form of the solid masses may be marked out by the changes in the percussion-sound without much difficulty. The amphoric note will be detected under the rare circumstances, observed by Dr. Bright, of entry of gas from the intestine into the tumor. In the great majority of cases, the anterior surface of the tumor lies in direct contact, without intervening substance, with the wall of the abdomen; but it is a mistake to suppose this invariably the fact. I have seen one case in which a fold of intestine passed directly in front of a large ovarian tumor; and M. Piorry refers to some five or six instances of the kind, observed by himself. The amphoric intestinal note would detect this unusual condition; but its rarity is such, that a doubt might almost arise whether the amphoric sound depended upon it, or upon the peculiar state referred to by Dr. Bright. It is possible (but I am unable to speak from experience) that the shape and outline of the space over which the special sound was audible might throw light upon its cause; the absence or coexistence of peculiar intestinal discharge, and the permanence of the phenomenon, would also aid in the diagnosis.

Circular mensuration of the abdomen with a graduated tape is useful as a means of ascertaining the amount to which the tumor increases in a given time. The extremest caution must be used in applying the tape on each occasion on precisely the same level, and with precisely the same tightness, as before.

I have occasionally detected a tolerably strong blowing murmur of intermittent type, evidently arterial, in connexion with ovarian cancerous growths. My impression was in these cases, that the murmur originated in the large vessels of the abdomen, compressed as they were by the tumor, rather than in the vessels of the latter.

The chief mechanical effects resulting from the presence of these growths are difficulty in discharging the contents of the bladder and intestine; anasarca of the lower extremities, from compression of the iliac and cava veins; and dyspnœa from detrusion upwards of the diaphragm and lungs. The heart sometimes undergoes elevation and detrusion to the left side; but I doubt the occurrence of derangement of function, as a consequence of this displacement. Some women suffer from frequent vomiting, the mechanical origin of which is proved by the absence of morbid change in the stomach on post-mortem examination. During the closing days of her life, a female, observed by M. Bouillaud, frequently voided, by a sort of passive regurgitation, rather than any active process, a quantity of dirty, sanguinolent matter; here the chief cause was obviously mechanical.

The cachexia is slow in occurring in connexion with ovarian cancer, and but imperfectly marked. I am, in truth, unable, either from what I have myself witnessed, or upon the foundation of cases hitherto published, to point out any series of symptoms that can be called characteristic of cancer of these organs,—that is, of symptoms whereby simple carcinomatous tumors may be invariably distinguished from other diseased enlargements of these parts, or whereby the period, at which deposition of cancerous matter in the walls of encysted formations arises, may be announced. On the other hand, I am far from believing that by patient, minute, and extensive observation of ovarian disease, such characteristic symptoms might not be found to exist; however, until such observation be undertaken, we can scarcely object with justice to the habit of numerous writers, who, in spite of the evidences of pathological anatomy, continue to group encysted growths and true carcinomatous tumors under the same head of "malignant disease" of the ovaries.

§ XII. Death, in cases of ovarian cancer, more commonly depends upon the changes occurring in, or on some effects produced by, the encysted formations to which the carcinoma is usually superadded, than on modifications having their seat in the latter production. When the mass is of large dimensions, its mechanical influence in interfering with the functions of adjoining parts, coupled with its irritative effects on these, hastens the progress of the exhaustion and sinking of the vital powers, which eventually bring the patient to the grave. Dr. Bright supposes, that, by pressure on the lacteal vessels, these tumors may directly interfere with the conveyance of nutriment to the system. In the majority of cases,

however, the fatal event is brought about by inflammatory action in the encysted mass itself, or in the peritonæum. The inflammation of the serous membrane originates sometimes without any evident cause; more commonly from the escape of some of the contents of a cyst into its cavity, the effect either of rupture (which may be spontaneous, or produced by a fall or blow), or of the operation of paracentesis. In a few rare instances, (such a case is reported by Dr. Bright,) effusion of cancerous matter into the peritonæum has been observed. Escape of the encysted fluids may take place into the intestines (adhesions having been formed between these and the adventitious mass), and diminution of the tumor proceed, while diarrhœa, and a tympanitic state of the encysted structure, ensue; or the fluid may be poured into the vagina (Monro): either occurrence is temporarily favourable.

§ XIII. The diagnosis of ovarian tumor is often obscure. The records of surgery demonstrate the fact; in some seven or eight cases the abdomen has been cut open for the purpose of removing a supposed ovarian growth, which an examination of the interior of that cavity failed to discover. The marks of distinction, generally available in cases of difficulty, are as follow.

(*a.*) In *ascites*, if the effusion be at all considerable, alteration of posture of the patient changes the form of the abdomen; if it be excessive, fluctuation may be sometimes seen, when the patient moves; — neither of these phenomena is ever observed in cases of ovarian tumor with cancerous deposition. Fluctuation, as discovered by manual examination, is more fully developed in ascites,* than in ovarian disease; and œdema of the walls of the abdomen more common in the former than the latter. In ovarian tumor the dull percussion-sound of its solid and fluid contents is superficial, and, when the mass has acquired any size, is perceptible at the centre of the abdomen; in ascites, on the contrary, (as was first noticed by Frank,) the inflated intestines float on the surface of the liquid, and furnish the clear intestinal percussion-sound in the umbilical region,— and it is only by exercising very forcible pressure in this region with the left hand, and then percussing upon this, that the dull sound of the fluid can be detected. However, this point of distinction, though very generally available, is not, as numerous writers appear to fancy, always to be discovered. In certain cases of enormous fluid accumulation in the peritonæum, the walls of the

* Accidental circumstances, however, may prevent the detection of fluctuation in cases of general peritonæal effusion. M. Piorry found, that in 17 cases reported by Andral the sign was evident in 6, obscure in 6, imperceptible in 5.

abdomen are pushed so much forwards, that the mesentery is not long enough to allow the intestines to reach the surface of those walls. In such cases of ascites dull sound is produced by superficial percussion of the umbilical region; sound of intestinal special character, on the contrary, by percussing when the walls are somewhat depressed: this interesting fact I have seen demonstrated by M. Piorry. As Dr. Bright has shown, too, "thickening of the peritonæum" coexisting to any amount with ascites will, by preventing the intestines from floating, give rise to similar source of error. Alteration of posture of the patient alters the level of the dulness in ascites in a much more distinct manner than in ovarian tumor.

Fibrous tumor of the walls of the uterus, seated near the fundus especially, may be distinguished from an ovarian mass by having, at all periods of its growth, appeared more median in its position than the latter; by the greater solidity and total absence of fluctuation; by the greater evenness and uniformity of its surface (if, however, there be more tumors than one, an irregular nodular outline is produced); by the sensation of continuity of the neck of the uterus and the tumor, as ascertained by the weight felt on pushing up the cervix in the vagina, and also by the communication of any impulse, given the tumor through the abdominal walls, to the finger placed against the cervix. I know of no means whereby a *pedunculated* sub-peritonæal uterine fibrous tumor may be satisfactorily distinguished from an ovarian solid mass, if the peduncle be of any length.—From the enlargement in *natural pregnancy* ovarian tumor may be distinguished by its rising from the side of the pelvis; by its more lateral position; by its persistence, after the ordinary period of pregnancy has ceased; and by vaginal examination.—The distinctive characters of hepatic, splenic, and renal tumors are stated in the sections devoted to those organs.

In at least three of the cases on record, already referred to, where the abdomen was opened for the removal of ovarian tumor, no tumor of any kind was discovered.

An alteration of form of the abdomen, depending on irregular contraction of the muscles, and apparently connected with local peritonitis, or in some cases (according to M. Piorry) with inflammation of the mucous membrane of the intestines, has sometimes been mistaken for ovarian enlargement.—Allied with such cases are those of "hysterical distension of the bowels," which may give rise to remarkable mistakes in diagnosis. I have recently had an hysterical female under my care, in whom the appearances of tumor

(produced really by flatus) were singularly deceptive. Dr. Bright records the case of a young woman, who submitted to incision of the abdomen for the removal of an ovarian tumor, simulated simply by irregular accumulations of flatus in the intestines.

(*b.*) Let us suppose a tumor of the abdomen has been decided to be ovarian, its *nature* requires next to be determined. If well-marked cancerous disease coexist in some other organ with the ovarian tumor, the latter is probably carcinomatous: if no other part be apparently carcinomatous, and the cachexia be established, we are entitled to infer that the affection of the ovary is of cancerous character, with a degree of confidence proportional to the surety of our diagnosis in respect of other parts. But both of these general guides may be absent, or may fail us: we must then depend on the local characters of the disease.—*Fibrous tumors of the ovary* may, when large, be distinguished from scirrhus by their size; from encephaloid by their hardness, inferior elasticity, smoother non-lobulated surface, and uniform consistence in every part. The condition of the patient's health may facilitate the distinction. — *Unilocular cysts* are of globular outline and non-lobulated; they usually contain a serous fluid, in which case the fluctuation of this will readily prove that the mass of the tumor does not consist of cancerous matter; and, even where the contents are of a gelatinous character, the phenomenon is sufficiently well marked to prevent mistake. They are frequently moveable, and are of slow growth. The constitution suffers little in this disease. — *Multilocular cysts*, on the contrary, either from the consistence of their contents (firm jelly-like matter, blood, fluid or coagulated, atheroma, acephalocysts, pilous and fatty substance), or from the non-communication of their cells, rarely give rise to more than very obscure fluctuation, which may almost be confounded with the elastic doughiness of encephaloid; careful examination will however enable the observer to avoid this error.

It is not enough, however, that we be able to affirm that the entire mass of the tumor is not composed of cancer, — an extremely rare occurrence; it is necessary to ascertain whether, and to what extent, encysted growths contain carcinomatous formations in their walls. In certain cases this may be done by the detection, both by manual examination and percussion, of irregular indurated masses contrasting with the softer divisions of the remainder of the tumor; when the cysts are exceedingly tense from thorough repletion with fluid, this sign of lobulation may not be ascertainable: in this state of things evacuation of the fluid by paracentesis will

remove this difficulty in the way of the diagnosis. Nevertheless, the discovery of these lobulated masses is not a certain sign of cancerous formation; bunches of subcysts with gelatinous or albuminous contents (I mean, as respects their outward appearance) aggregated in the parietes of larger cysts, give rise to a precisely similar sensation.—When hydatid fremitus exists in a marked manner, the presence of *acephalocysts* may be safely announced. Rapidity of course of the disease furnishes one of the best evidences of encephaloid complication.

The existence of peritonæal adhesion may be occasionally detected by the crepitus, shown by Dr. Bright* to be producible in such cases by manual examination. When the disease is cancerous, this point is *practically* without importance, except in so far as that such adhesions being more common when the affection is cancerous, their detection may be of indirect aid in a case of difficult diagnosis.

§ XIV. The only point, upon which I am desirous of insisting strongly in respect of the medical treatment of ovarian multilocular cystoid tumors, complicated with encephaloid deposition in their walls, is the importance of giving a full trial to iodine. From what I have myself seen, I feel justified in recommending the use of the ioduret of arsenic internally, combined with free inunction over the abdomen of the ioduret of lead ointment, as being capable of, at the least, arresting for a time the increase of such tumors, and, in certain cases, of obviously diminishing their size. I have certainly succeeded in producing this latter favourable effect in one instance, where all evidence combined to prove the existence of cancerous formation in the morbid mass.

It is important to remember, that giving exit by puncture to the fluid contents of cysts of the ovary, containing encephaloid substance in their walls, must (in the same manner as in the breast) afford mischievous facility for the development of the cancerous matter. This distinctly appears to have been the result of the operation in a case related by Dr. Seymour (op. cit. p. 68): a tumor of this kind was punctured with, as is usual, temporary amelioration of the symptoms; but the patient was subsequently unable to pass a month without a repetition of the process—"which each succeeding time became more difficult, from the *increase of the solid tumors* in the abdomen." Nor should the operator forget that the accidental escape of some of the contents of the cysts into

* See an excellent paper by Dr. Spittal in Cormack's Edinb. Journal, May 1845.

the peritonæal cavity, followed by fatal peritonitis, has (whatever be the cause of the fact) been of more frequent occurrence, where cancerous products existed in the mass, than when the disease was purely cystoid. In all forms of ovarian cyst I believe it to be most judicious to regard tapping as a mere method of removing the effects of pressure, and to delay its employment until mechanical relief of the kind be absolutely required: such delay I should more emphatically advise in cases of cancerous disease.

A curious case is recorded by Dr. Bright, of a "malignant tumor, probably ovarian, discharging constantly from the wound made by paracentesis." The orifice of the fistula gave issue to a vascular excrescence; the tumor was hard to the feel, irregular on the surface, and apparently adherent to the abdominal parietes. The woman enjoyed tolerable health; and it is probable, as the learned reporter of the case supposes, that the formation of the fistula conduced to her comfort and to the prolongation of her life: but upon the infinite rarity of such cases it is needless to dwell. Nor do they afford any just motive for the revival of the once not very uncommon practice of purposely establishing a fistulous communication with the external surface.

If there be any opinion, bearing upon the practice of our art, which it would appear justifiable to adopt earnestly upon *à priori* grounds alone, it is that ovarian cancerous growths should not be removed by the knife. Almost all the objections to the excision of carcinoma in general apply fully, when the disease is seated in the ovary; and the dangers of cutting out a tumor of any kind from the abdomen are not to be lightly encountered. Yet, even in such a matter as this, experience is infinitely to be preferred to the most plausible argumentation. Experience has not hitherto solved the problem, however. Of the some seventy cases of extirpation of ovarian tumor on record, there are many in which the description of the parts removed is too vague to admit of a positive opinion being formed as to the nature of the disease; and the total number in which carcinoma is said to have existed is too small to justify an inference, in either direction, as to the expediency of the proceeding.

SECTION V.

UTERUS.

§ I. The frequency in this country of cancer of the uterus, as compared with that of other organs, cannot be numerically ex-

pressed. From the experience I formerly enjoyed in the Paris hospitals, I can entertain no doubt of uterine cancer being more prevalent in the French, than in our own, capital. The extent to which destruction of life is ascribed to the disease in the Paris Registers is indeed most striking: in 2996 of 8289 cases of fatal cancer the uterus was the affected organ; and of the total female deaths registered during this period (188,116) 1·6 per 100 were referred to cancerous disease of the womb. It is obvious, however, from the language of M. Tanchou, that maladies, which do not strictly class with cancer, are included in the returns.

§ II. Uterine cancer is more commonly solitary than associated. There can be no question that the womb ranks among those organs less prone than certain others (for instance, the mamma and testis) to contaminate distant viscera. Among thirty-seven females cut off by uterine cancer, and examined by M. Ferrus,* seven only exhibited secondary formations elsewhere. M. Louis informed me, some years ago, that he had never observed consecutive cancer of the stomach under these circumstances; nor does the breast suffer in women whose uterus is affected. Propagation of the disease to the adjacent structures by simple infiltration, and also lymphatic contamination, is, on the other hand, common in uterine cancer.

Hence it follows, that uterine cancer is commonly primary, and possessed of comparatively slight tendency to contaminate the system generally. Of secondary affection of this organ, the stomach being the primary seat of disease, I have observed, and in a previous chapter mentioned, an example; some few others, too, are on record. Certain writers have manifestly exaggerated the infrequency of secondary disease, for the purpose of upholding the propriety of amputating the cervix as a curative measure, — such writers are, for example, Canella † and Lisfranc.

§ III. Scirrhus and encephaloid both form in the uterus; I doubt whether true colloid has ever been seen in this organ. Both those species here exhibit a special tendency to assume the infiltrated form. The occurrence more especially of scirrhus in the shape of a superadded tumor is, at the least, singularly rare; in the numerous cases in which the practice of the French hospitals afforded me the opportunity of seeing the uterus, both during life with the speculum, and after death, no example of such condition occurred. The frequent mention of scirrhous tumors by writers arises, in the

* Gazette Médicale de Paris; Juillet, 1830.

† Cenni sull' estirpazione della bocca e del collo dell' utero, nei casi di scirro o Cancro, &c. p. 18. Milano, 1821.

first place, from their habit of applying this term to fibrous growths; in the second, from the fact, that in consequence of the irregularity of infiltration of the cervix with cancer, or from its being in some parts hypertrophous, while the adjacent strata are atrophous, an irregularly tuberiform outline, visible and palpable, is produced.

§ IV. The section of a scirrhous cervix presents the general characteristics of this species of cancer in a state of infiltration. When deposited in such quantity in a particular spot as to simulate the appearance of a tumor, the structure is usually of the chondroid variety. With the progress of events the firm material becomes saturated with creamy fluid, and softens into a pultaceous mass, which on section sometimes exhibits an areolar aspect.

Infiltrated encephaloid, of much rarer occurrence than scirrhus, increases the size of the organ more than the latter; after the establishment of ulceration, large masses of this species of growth, five or six times as large as the body of the uterus itself, have in rare instances sprung up and filled the vagina more or less completely. These masses constitute, under the different conditions in which they present themselves, the polypus hæmatodes of Baillie, one variety of the cauliflower excrescence of Clarke and other English authors, the fungous and hæmatoid cancers of Boivin and Dugès, the sanguineous cancer of Duparcque, and the medullary or cephalomatous polypus of Hooper. Although, when in the form of a fungous mass, encephaloid usually springs from an ulcerated basis on the external surface of the cervix, yet (as Baillie and Hooper, among others, have shown) it may originate under the lining mucous membrane of the interior of the neck or body of the organ, and thence protrude into the vagina. Madame Boivin also speaks of a tumor with a narrow base springing from non-ulcerated cervical carcinoma, and coexisting with ulceration of the interior of the uterus. When such growths spring from an ulcerated or non-ulcerated surface close to each other, a mass is produced having a cauliflower shape, as is likewise frequently observed in the stomach. In some cases these fungous productions contain a larger proportion of vascular tissue than of cancerous structure; in others, the latter greatly predominates: the importance of these accidental varieties, by no means peculiar to the disease in the uterus, has been much overrated by numerous writers. In very rare instances true encephaloid tumors originate in the body of the uterus.*

* Langstaff's case, Med. Chir. Transactions, vol. viii. p. 286. 1817.

M. Lisfranc states* that he has found colloid substance in this situation.

§ V. The disease originates by far the most frequently in the cervix; universal experience has settled this point beyond question. But it is less certain which lip of the neck suffers first; and as the disease has generally had time to implicate both, when the patient submits to examination, a satisfactory decision cannot readily be had. Writers are found to support both opinions. I have myself seen the disease limited to the posterior, but never to the anterior, lip.

It has been a commonly received opinion, that the glandular structure of the cervix forms the original nidus of the new formation. Dr. Montgomery† holds that there is a stage of the disease (previous to that usually described as the first) wherein "deposition of scirrhous matter around the muciparous glands, and thickening of their coats, in consequence of which they feel *at first* almost like grains of shot or gravel under the mucous membrane," associated with turgidity, and *crimson* discoloration of the os tincæ generally, form the anatomical characters of the malady subsequently becoming acknowledged cancer. The condition of things here described bears much similitude to that delineated, and set down among organic uterine diseases, by Madame Boivin,‡ under the rather ill-chosen title of "granular inflammation of the os uteri."§ That this special alteration of texture occurs is indubitable, but it appears to me, that demonstration of its constituting the first stage of cancer of the uterus is deficient; even in the three cases reported by Dr. Montgomery, the anatomical state was not such as *he* has described to be that first stage, but the actual first stage of writers in general, the cervix being nodulated, fissured, patulous, &c.

In rare instances, cancerous disease appears first in the body of the organ. M. Ferrus (loc. cit.) found it even limited to this part after death in 3 of 32 fatal cases. The internal surface is the ordin-

* Clinique Chirurgicale, tom. iii. p. 605. 1843.

† Dublin Journal of Medical Science; January, 1842.

‡ Boivin and Dugès, Diseases of the Uterus, Heming's translation, p. 373, and plate xxvii. Compare especially case 4, (p. 378,) where the affection had passed to the chronic state.

§ Even in its most acute form, the anatomical condition described by Madame Boivin is, I may remark, perfectly distinct from mammillation of the mucous membrane,—although recent writers frequently confound the two states, at least in words. The appearance of a mammillated cervix, as I have seen it frequently demonstrated by M. Louis, the originator of the term, is precisely that so common in the mucous membrane of the pyloric end of the stomach.

ary starting-point of formation under these circumstances. Still more rarely do the body and cervix become coetaneously and separately affected.

Consecutive infiltration of the uterus sometimes occurs in primary cancer of the vagina, the recto-vaginal, and vesico-vaginal septa, or even of the ovary; but upon the rarity of such occurrences it is unnecessary to insist.

§ VI. The form of cancer attended with hypertrophy of the non-carcinomatous part of the organ is most common in the uterus. This is more particularly true of encephaloid. The uninfiltrated portion of the uterus I have known to acquire three times its natural dimensions; the hypertrophy is of the soft and flaccid kind. I have often seen the body unaltered in bulk in cases of scirrhus of the cervix, but never actually atrophous. The cavity is under the latter circumstances reduced in extent or even obliterated; under the former, widened, while its lining membrane exhibits the characters of marked venous congestion.

The coexistence of fibrous tumors of the upper parts of the organ with cancer of the os tincæ is not exceedingly uncommon; I have notes of two cases observed within a short period, and many other persons have noticed the association of these diseases.

§ VII. The diseased formation generally continues limited to the cervix or its immediate neighbourhood, before ulceration commences; when this change occurs, infiltration spreads upwards, in proportion as the erosive destruction of the neck advances. Such is the mode of progress in the great majority of cases; while, in a few instances on record, the scirrhous deposition had involved a large share of the body before the occurrence of ulceration. I have never seen the entire organ scirrhous, or read a satisfactory description of such a state; and, as a general truth, the infiltrating process is but a few lines in advance of the ulcerative, and the line of demarcation between infiltrated and natural structure abruptly defined.

§ VIII. While the disease advances in the uterus, the ordinary changes pursue their course in the surrounding textures. The organ becomes more or less fixed, from infiltration of these textures with simple exudation-matter, or from the extension of the cancerous deposition amid them. The propagation of the disease to the vagina commonly commences with the anterior wall (a fact supporting the opinion of those who maintain the priority of invasion of the anterior lip of the os); it thence proceeds to the septum, the bladder, and urethra; or, attacking first the posterior

paries of the vagina, exercises its ravages in the direction of the rectum. In other cases the cellular tissue around is specially affected,—the broad ligaments, Fallopian tubes, and even the ovaries becoming implicated, along with their investing cellular structure. Some of these parts may suffer independently of obvious continuity; I have known the bladder become cancerous in this manner. In very rare instances, the body of the uterus suffers such extensive destruction as to lead to perforation of the peritonæum, before the walls of the bladder or rectum undergo ulceration. Should the uterus, previously to the perforation of its serous investment, have become adherent to the rectum, colon, or ileum, a communication may be formed between the vagina and intestine by a canal formed through the remaining portion of uterus.

When the vagina escapes cancerous infiltration, it is almost constantly the seat of chronic infiltration. Bayle has found it thickened and covered with pseudo-membrane; or the surface is dry, blackish, and rugous, and may be studded with saline incrustations. The Fallopian tubes are sometimes inflamed, and filled with pus. The University College collection contains a specimen, wherein dropsy of one of these tubes coexists with uterine cancer. The frimbriated extremities are sometimes closed by peritonæal adhesions. The ovaries are atrophous, or hypertrophous, and may contain cysts or fibrous growths.

The urinary organs are prone to suffer. To cancerous infiltration of the bladder by extension, and by isolated development, I have referred already; this infiltration leads commonly to perforation of the bladder, and the formation of a communication with the vagina, while a similar opening may be effected in the rectum. The mere pressure of a growth protruding into the vagina may (as in a case narrated by Dr. Warren) cause early perforation of the bladder. Once the passage is opened into this organ, its cavity begins to contract; I have found it not larger than two walnuts, in a case of which the total duration had been twenty-two months. Chronic cystitis, before perforation, is less common than might be supposed. When infiltration spreads in such manner as to block up the vesical orifices of the ureters, those tubes undergo gradually increasing distension; until, as in some recorded cases, they actually reach the calibre of the small intestine, becoming flexuous, with thickened walls, while their lining membrane, of dull white colour, is sometimes thrown into folds. The pelvis and infundibula undergo similar distension. If this condition of things affect one ureter, the consequent hydronephrosis causes atrophy of the kidney

by pressure. If both ureters are plugged up, such atrophy cannot, for obvious reasons, occur. Death would, indeed, be an inevitably rapid consequence, were it not that anasarca may relieve the renal organs for a time sufficient to allow the progress of destruction around the orifices of the ureters to open a passage for the imprisoned urine. This is not the only instance in which extension of disease is the source of immediate preservation of life. Chronic simple nephritis may exist independently of distension or obvious affection of the ureters. The urine voided under these circumstances is alkaline. Pyelitis doubtless occurs in some of these cases, but I have not actually observed it.

Local peritonitis, following a slow and insidious course, is a common morbid state in uterine cancer. Adhesions in various directions are met with; the omentum has been found by different observers adherent to the uterus, a condition to which Dr. Montgomery invites attention.*

Cruveilhier, who has particularly studied the condition of the lymphatic system in this disease, states that the pelvic glands are almost always implicated; two of these situated at the upper part of the sciatic notch being most frequently, and often solely, affected. The lumbar glands are much more rarely diseased, (a fact already noticed by Bayle,) and are often enlarged and red without containing a particle of carcinoma; the inguinal glands do not suffer, unless when the disease extends to the external genitals or orifice of the vagina. Andral has found the diseased matter in the parietes of the thoracic duct; Hourmann† traced it along the lymphatics from the uterus to that tube. The matter contained in the intervening lymphatics was precisely similar to that appearing in the uterus; their walls were thickened, but their lining membrane perfectly transparent and smooth, the matter easily removeable, and the valves perfect. Such implication of the thoracic duct must, however, be rare: I have found it perfectly healthy in seven or eight cases, expressly examined with reference to this point; and M. Cruveilhier, who habitually opens the tube in cases of uterine cancer, has never known it so affected but once.

M. Lisfranc‡ affirms that he has often found the uterine nervous plexuses inflamed, swollen, and sometimes softened, and in one instance cancerous. M. Serré met with cancerous destruction of the sacral plexuses.

* Dublin Hospital Reports, vol. v.

† Rev. Méd. 1837, tom. i. p. 167.

‡ Op. et tom. cit. p. 609.

§ IX. Bayle was certainly among the first to state, what has since been amply confirmed by general experience, that apparent prodromata are sometimes observable in uterine cancer. It is unquestionable that, before the actual local outbreak of the disease (speaking with regard to symptoms), not a few females suffer from extreme general discomfort, restlessness, total loss of appetite, deep melancholy, and transient sharp pains in different parts of the body, —a series of disturbances of which the cause is sought in vain, until suppression of the menses, or menorrhagia, directs attention to the uterus. But these prodromata are only apparently entitled to this designation; structural disease has certainly almost always set in, when they exhibit themselves, and it is yet a question whether such change has not always previously occurred. On the other hand, there are cases (and it has occurred to me to observe two such) in which the disease has advanced sufficiently far to cause partial destruction of the cervix, before any local symptom has attracted the patient's attention. Such cases are of the *latent* class.

In the ordinary progress of events uterine cancer is early attended with very clear and obvious functional disturbances, and the symptoms thus caused have commonly been described in connexion with two stages of the disease,—that preceding, and that following, ulceration. I shall follow this plan, sanctioned, as it has been, by general approbation; guarding the practitioner against too unlimited confidence in the invariable justness of the division into these stages, by referring specially to some of the more striking deviations from the common character and sequence of symptoms.

First stage.—Occasional uneasiness or dull pain in the uterine and sacral regions, especially in the erect posture, during menstruation or for a period varying from a few hours to some days after sexual intercourse; a dragging sensation in the inguinal and lumbar regions, accompanied with a feeling of weight and distension at the hypogastrium, or at the perinæum and anus; irregularity in the quantity, quality, and frequency of the catamenial discharge in women still menstruating, or hæmorrhage (commonly attributed by the patients to a return of that function) in women of more advanced age; leucorrhœal discharge, of whitish or yellowish colour and moderate consistence, without fœtor, and becoming red under excitement, or giving place to slight effusion of pure blood after sexual congress; trifling irritability of the bladder, or more rarely of the rectum, states sometimes accompanied with slight difficulty in voiding the contents of those viscera; and pruritus, more or less distressing, of the labia and adjoining parts; — form the usual

train of local symptoms in the early period of the disease. The urine may at this juncture have already become alkaline from nephritic irritation; and its impregnation with some ropy catarrhal matter (pus or muco-pus altered by an alkali) is not excessively uncommon. The proneness of the female for the generative act varies.*

Deceived by the pains felt at the lower part of the rectum, and doubtless anxious to put the most favourable construction on their symptoms, females frequently fancy their sufferings due to hæmorrhoids, which sometimes (though rarely, and never perhaps otherwise than as a coincidence) exist at this period. The pain is really caused by pressure of the cervix on the rectum, in consequence of its tumefaction, coupled sometimes, as M. Lisfranc has observed, with slight anteversion of the uterus: in rare instances it depends on coexisting cancer of the rectum.

By manual examination of the hypogastrium nothing unusual is discovered in the greater number of cases. If extensive hypertrophy of the body coexist with the cancerous infiltration of the neck of the organ, a tumor, corresponding in size to the degree of this change, may, in thin persons especially, be detected, after the bladder has been emptied; and by careful percussion (which is rarely in this stage too painful a process to be satisfactorily employed) dulness of sound commensurate with the size of the tumor may be recognized. Examined *per vaginam*, the lips of the cervix are found hardened and thickened more or less extensively, and sometimes tender to the touch. The orifice is unnaturally open, sometimes sufficiently so to permit the point of the finger to be pushed on to the cavity of the body; and the cervix not uncommonly lower down in the vagina than is usual.† The enlargement of the lips is rarely equable; it is much more common to find one or two, rarely more, irregular elevations, separated by fissures. Occasionally

* The following passage, attributed to Cleopatra, is quoted by Lisfranc: "Quibuscumque matricis humor ad vulvam respondet, harum corpus frigidum est, nec possunt aliquo modo masculi coitum gratum habere; frigidum vero corpus intrinsecus habent usque in extremas partes." It is probable that this is generally true of women suffering from incipient scirrhus of the os tincæ; but I have, on the other hand, actually known females complain of the increased propensity as among the annoyances of their condition.

† In estimating this point, however, it is to be remembered that (as first distinctly stated by Lisfranc) there are some women, in whom the cervix is found high up and short in the morning, low down and apparently enlarged in the evening. The apparent enlargement arises from the descent of the cervix bringing a larger share than usual of that part within reach of the finger.

these elevations feel distinctly softer in some points than others. It is said, that elasticity may be distinguished where the infiltrated material is encephaloid, but I have had no opportunity of ascertaining this. If the cervix be pressed between two fingers, a slight flow of blood often follows, and this may be accompanied with a crepitating feel.

Observed through the speculum the cervix appears tense, tumid, irregularly tuberiform and fissured, and of a dull-white colour; in the latter particular the contrast with the surrounding tissues is sometimes strikingly marked. In less common cases the colour of the cervix is dirty brownish-red.

Second stage.—At a variable period the second stage commences, and is usually marked by a change in the constancy, intensity, and character of the pain. It becomes more or less habitual, acquires the lancinating character and extreme severity. Generally situated in the uterine region, and shooting along the broad and round ligaments, this pain is sometimes replaced by sharp pangs in the course of the sciatic, crural, or obturator nerves, recurring, it may be, at fixed periods of the day, — pangs which have, according to the testimony of Bayle, been in certain instances so violent as to induce fatal "cerebral fever:" such extreme results as these are, however, rare; though the intensity of pain sometimes, beyond a question, shortens life by exhaustion. These neuralgiæ may be attended with the debility, and inability to move, of ordinary sciatica. The excretion of the urine and fæces grows more and more painful and difficult; alternate constipation and diarrhœa sometimes distress the sufferer: in rare instances* insuperable obstruction is induced by pressure of enlarged glands on the bowel. Perforation of either, or more rarely of both the adjacent hollow viscera, at length takes place, announced first, in the case of the rectum, by the passage of flatus through the vagina: the latter canal is now converted into a cloaca for the reception of the uterine discharges and the vesical and intestinal excretions. Hæmorrhage may, or may not, meanwhile have become of more and more frequent recurrence: the quantity of blood lost on each occasion does not uniformly increase; on the contrary, as the frequency of hæmorrhage augments, its amount often lessens (precisely as is observed in the hæmoptysis of phthisis and of pulmonary cancer); while in other cases females merely fancy the early attacks the most severe, because they attracted more attention than subsequent ones. The

* Montgomery, Dublin Hosp. Reports, vol. v.; and Edinb. Med. and Surg. Journ. January 1829, p. 220.

vaginal discharge now commonly acquires the cancerous fœtor and a dirty-white or greenish colour, is thin and serous (in some cases perfectly watery), sometimes mixed with blood, or, especially where encephaloid fungi have sprung up, with shreds or lumps of cancerous matter. Its acrid properties are usually so marked, that its contact with the vulva, perinæum, and folds of the thighs, causes excoriation of those parts, and furnishes an additional cause for the pruritus felt in the former situation. The discharge, however, sometimes continues trifling for a time after ulceration has set in.

According to the state of advancement of the disease, a breach of surface, of more or less extent, with indurated margin, is detected on examination *per vaginam*; the edges of this ulcer may give origin to fungating growths of all varieties of form, and hard and firm, or soft, pulpy, and bleeding on the gentlest touch. The finger is withdrawn smeared with the sanies of the ulcer. Should the vagina or rectum be implicated, this is easily recognised; and, should the disease have spread to the neighbouring tissue in the pelvis, the whole mass of the uterus and implicated structures is almost immoveable. When the urine distils through the vagina, deposition of its saline constituents in the rugæ of that canal leads to roughness and inequality of surface, and sometimes to the actual formation of calculous concretions: these are composed of phosphates.

Viewed through the speculum, the diseased surface exhibits the different characters of cancerous destruction. At advanced periods the use of the instrument can rarely be required for purposes of diagnosis, is generally productive of much pain (I have known it cause shrieks of agony), and is attended with the risk of rupturing the vagina. M. Pauly* has actually known such rupture productive of hæmorrhage, which proved fatal in two hours.

The general symptoms are usually well marked in uterine cancer—the cancerous facies, and straw-coloured tint of skin particularly so. Loss of sleep, failure of strength and emaciation make rapid progress. The digestive and gastric disturbance is extreme; almost constant nausea, and inability to retain even the lightest food, increase in some cases the general distress, and end occasionally in obstinate and uncontrollable vomiting. Dr. Montgomery has endeavoured to trace the latter condition to adhesion of the great omentum to the uterus, but it may exist independently of any such adhesion. I have found it connected with softening of

* Maladies de l'Utérus, p. 51. 1836.

the anterior and posterior walls and great curvature of the stomach; and it possibly, in some cases, depends on mere irritation. It is important to remember that it has no necessary dependence on cancer of the stomach. Pain in the mammæ is an occasional symptom; as also swelling of these organs, which, as Lisfranc remarks, is sometimes taken by patients themselves, at the outset of the disease, for an evidence of health. Anasarca of the labia and inferior extremities is very commonly observed; in a case under the care of Dr. Montgomery it coexisted for several days with complete suppression of urine, and began to disappear as the natural flow of renal secretion was restored. Post-mortem examination showed that the orifices of the ureters must have been completely plugged up with cancerous matter, and that the progress of the disease had at length opened a passage for their contents, in the manner already described. The mental depression of these sufferers, though great, is not habitually so extreme, as the hopelessness of their condition and the agony endured might lead us to anticipate. The influence of the uterus on the encephalon becomes particularly obvious in the insane; the ravings of such doubly afflicted persons frequently turn upon sexual intercourse.*

Such is the ordinary course of events in uterine cancer: exceptional conditions, as the following, occur occasionally. Pain, for instance, instead of increasing more or less steadily in violence, may be much more severe at the outset than at the close: it may be trifling throughout; or it may be actually absent from first to last, and the exhibition of opiates never become necessary. Menstruation may continue regular even after ulceration has commenced; at least, I have known women regular in point of time after abrasion had occurred, and such state is far from very uncommon previously to that change. But the quantity and quality of the catamenia are unnatural from the first; at each period women find the flow may commence by a gush of blood; and coagula of larger size than the female is accustomed to, are passed. It is a common error to believe that in women free from menstrual derangement, no coagula are passed during the catamenial period. I have satisfied myself, by repeated interrogation of a large number of women, that the precise converse would be nearer the truth.

Hæmorrhage may be deficient throughout; unquestionable examples of the fact are on record. On the other hand, profuse discharge of blood may be the very first occurrence attracting the patient's attention to the genital organs. Dr. Blundell has referred

* Scipion Pinel, Maladies de l'Encéphale, p. 432.

to this important circumstance; and I learned some years ago from M. Louis, that, of twenty-one cases of uterine cancer observed and examined after death by himself, one went through its entire course without hæmorrhage; in three, flooding did not occur till after other evidences of uterine disease; in the remaining seventeen it was the first symptom. I should be inclined to judge this proportion above the common mark; but of the reality of the fact in the cases referred to, no possible doubt can be entertained.

Again, the constitutional disturbance may be slow in appearing, and slight when it sets in,—a fact to which I have already (p. 449) sufficiently referred.

In respect of its influence on gestation, scirrhus of the cervix has not, in several cases on record, prevented conception from being accomplished; pregnancy passing to its termination; and delivery being effected either by the unassisted efforts of nature, by version, or the forceps. Parturition may occur without immediate ill consequences after ulceration has long set in, and even after repeated hæmorrhage has weakened the female to the last degree: in a case, related by Bayle, death did not follow until five months after delivery; though the cervix was totally destroyed at the time.

§ X. In 107 cases, observed by Dr. Lever,* the mean duration of the disease was 20·35 months; the shortest duration 3·00 months; the longest 66·00 months. This estimate, doubtless, refers to the *apparent* duration of the disease; that is, from the occurrence of the first obvious symptoms: the *real* duration of the malady is unquestionably greater, but to what extent is yet undetermined.

§ XI. Death may terminate the patient's career, while the ulcerative process is in its incipient stage; or life may be protracted, until the uterus has been almost wholly destroyed. The fatal event is hastened in some cases by peritonitis, the result of mere irritation, or of perforation. I have seen death caused by gangrene of the cancerous and adjoining parts; a change in the odour of the discharge, hiccup, vomiting, coldness of the extremities, and small fluttering pulse announced its occurrence. Cruveilhier observes that the destruction of substance may under these circumstances be so great, that all vestiges of cancerous structure in the uterus itself shall have disappeared, and the existence of carcinoma in the lymphatic system furnish the only evidence of the nature of the disease. Such cases have doubtless been sometimes mistaken for primitive gangrene.

§ XII. At no age can females be said to be exempt from the

* Med. Chir. Trans., vol. xxii.

chances of uterine cancer: 529 cases collected by Boivin and Dugès and Dr. Lever may be arranged, as follows, in respect of age.

Ages.	No. of Cases per cent. occurring at each Age.	
	Total Cases observed = 120. (Lever.)	Total Cases observed = 409. (Boivin, Dugès.)
Under 20	. .	2·93
20 — 25	. .	20·29
25 — 30	3·30	
30 — 35	15·00	24·93
35 — 40	10·83	
40 — 45	20·00	25·91
45 — 50	20·00	23·22
50 — 55	13·30	1·71
55 — 60	14·16	
60 — 65	·83	0·97
65 — 70	1·60	
70 — 75	·83	

I have myself seen the disease in a woman aged seventy-eight; Cruveilhier has known it to appear in the eighty-fourth year.

One hundred and three of Dr. Lever's patients produced 596 children, rather more than 5·75 to a marriage, which is above the average number in England. Hence the tendency to uterine cancer clearly does not lessen the procreative energy of the female. To infer that frequent parturition promotes the development of the disease, is not warranted by these facts; and such inference is further shown to be inadmissible by the fact that 8·8 per cent. of the patients observed were sterile, also a higher proportion than that of unprolific women in this country.

Dr. Lever has investigated the early state of the catamenial function in these females with the following results:

	Per cent. of Cases.		Per cent. of Cases.
Good uterine health in .	20·80	Vicarious menstruation .	0·83
Dysmenorrhœa .	54·16	Menorrhagia . .	1·66
Amenorrhœa . . .	15·80	Syphilis . . .	6·60

But to what precise amount of catamenial derangement is the term dysmenorrhœa here applied; and is the ratio stated much above that observable in the humble classes of the population of London generally? The low proportion of syphilitic women supports what I have formerly said (p. 95) on the comparative immunity of prostitutes from this disease. There is no shadow of proof that, as has been affirmed by different persons, it ever owes its production to "disproportionate and intemperate intercourse."

Of Dr. Lever's patients, 5·83 per cent. were spinsters; 86·6 married women; 7·5 widows: for obvious reasons no just ætiological inference can be drawn from these numbers; nor from the fact that 40 per cent. of these females had miscarried, each a mean number of 2·54 times.

Hence, in point of fact, of the causes of uterine cancer nothing special is known. M. Cruveilhier, whose opportunities of observing the disease among the aged inmates of the Salpêtrière have been very considerable, emphatically avows that, neither dissoluteness nor chastity, sterility nor fecundity, healthy pregnancies or the contrary, the habit of suckling or of consigning the duty to others, regular or irregular menstruation, the occurrence or not of abortion, an active and laborious, or an inactive and listless life, hereditary influence, temperament, scrofula, syphilis, leucorrhœa, the existence of polypi or of fibrous tumors, appear to exercise the smallest influence on the development of uterine cancer. And this statement is (with perhaps the single exception of the alleged want of influence of hereditary taint) but the echo of general experience.

§ XIII. The local and general symptoms of all uterine diseases, especially in their early stages, are so similar, that examination with the finger always, and with the speculum generally, is required for their distinction. The diseases likely to be confounded with cancer vary, according as ulceration is, or is not, present.

(*a.*) *Ulceration absent.*—In *neuralgia of the uterus* the pain endured is very much that of early cancerous disease: but menstruation continues longer regular; the cervix is exquisitely sensitive to the touch, and, though sometimes tumid, is unaltered in form or structure, neither is the orifice unusually wide; the affection occurs often in young adults, and remains stationary for years; coitus is much more painful than in cancer.

Simple hypertrophy with induration, the result of chronic metritis, affects the entire cervix, and hence produces general and equable enlargement: not the uneven lumps, separated by fissures, observed in scirrhus.* Advice is generally sought at an earlier period in chronic induration than in cancer: its symptoms are, in other words, more urgent at the first. An hypertrophous cervix retains the natural red colour; I have seen the tint more marked

* It must not be forgotten that parturition leaves notches at the orifice of the uterus, and sometimes irregular elevations; the os, too, will sometimes admit the point of the finger in women who have had children. Dr. H. Bennet (Lancet, April 1845) says, that these notches radiate towards the centre of the os tincæ.

than natural even, and felt the part distinctly hot: the conditions in scirrhus are perfectly different. The efficacy of antiphlogistic treatment in the one, its comparative inutility in the other, case will further establish the diagnosis.

Tuberculous (scrofulous) induration of the cervix is excessively rare. The presence of tubercles in the lungs, and youthfulness of the patient, might justify suspicion of its existence in cases where points of induration appear in the part. After ulceration occurs, the caseous quality of the discharge is said by M. Lisfranc to be a sufficient guide to the nature of the affection.

Pregnancy.—Numerous cases are on record, in which incipient, and even tolerably advanced, pregnancy has been mistaken for carcinomatous disease. Should careful consideration of the signs of pregnancy* not fully justify a positive opinion, it is imperative on the practitioner to watch for a time, rather than hazard his reputation upon a doubtful issue. I have myself known a woman delivered of a child (at about the fifth month) within a week after her abdominal enlargement had been pronounced to depend on tumor of the uterus. When pregnancy and cancerous infiltration coexist, the diagnosis may become excessively difficult. Dr. Ashwell's remarks† on this subject are particularly valuable: it is, however, to be remarked, that fibrous growths are a much more common cause of obstruction to parturition than scirrhous infiltration.

A fibrous tumor, protruding through the os tincæ from the interior of the uterus, is distinguished from scirrhous formation of the cervix by its being single, by its strictly tuberous or globular outline, by its even surface and want of lobulation, its larger size and pedunculated attachment.

From *non-pedunculated fibrous tumors* developed in the substance of the cervix, there is really no distinction in the early stage; such growths may be attended with pain of lancinating character, yet the scirrhous cervix is more sensitive, and the very uneven knotty appearance more marked, than when fibrous growths are present; the latter are seldom or never so superficially placed as scirrhous infiltrations. The mode of progress of the diseases, however, is widely different; and the one is as common as the other is rare.‡

* Darkened hue of the areola sometimes occurs in cancerous disease of the uterus; but the fulness of nipple, and enlargement of the areolar follicles, &c. observed in pregnancy, are deficient. See Montgomery, on the Signs of Pregnancy; and Stark, in Ed. Med. and Surg. Journal, vol. lvii p. 163. January, 1842.

† Diseases peculiar to Women, Part ii.

‡ It has occurred to me to see but very few cases of true fibrous nodules about

Cancerous deposition in the body of the uterus may be distinguished from *interstitial fibrous tumors* by the comparatively small size of the organ: in the latter disease it undergoes enlargement like that produced by pregnancy. Manual examination and percussion of the hypogastrium, and examination *per rectum*, will guide the observer in the distinction.

Elongation of the cervix is distinguished by the shape of the part; by the deep fissure between the lips, if both are implicated; and by the usual absence of marked induration.

Acquired ectopiæ or *displacements* of the uterus are, many of them, productive of symptoms closely resembling those of incipient cancer; this is especially true of anteversion and anteflexion,* as might be anticipated from the fact, that scirrhous infiltration of the cervix is not very uncommonly attended with some amount of those changes of attitude and shape.

Confusion of *ovarian tumor* with scirrhus of the cervix is scarcely possible; a carcinomatous mass in the body of the uterus will be distinguished in the same manner as a fibrous growth so situated. (See p. 439.)

(*b.*) *Ulceration present.—Chancre* of the cervix uteri is distinguishable by the less amount of induration and enlargement of the cervix, the more superficial character of the ulcer and the absence of pain. Venereal ulcers, too, are readily influenced by mercurial treatment. The matter of female chancres contains, according to M. Donné, a peculiar animalcule (the *vibrio lineola* of Müller), which he presumes is *not* contained in discharges of other nature; Froriep affirms he has found it in common leucorrhœa: I have no experience myself in the matter. The true test of *primary* chancre from all other ulcerations consists, as I formerly saw demonstrated by M. Ricord, in inoculation of the matter of the suspicious sore: if it be venereal, a chancrous pustule is the result, the further progress of which may be checked by cauterisation.

Simple ulceration of the cervix is distinguished by the absence of induration, and by the less marked fœtor of the vaginal discharge. Such ulceration is commonly superficial; but I have seen the adjoining mucous membrane tumid and puffy to such an amount, as

the os tincæ; nor have I met with more than two in any one cervix. Sebastian is stated to have examined a uterus, the lower part of which was so much enlarged by *several* such tumors, that it was broader than the fundus. Vid. Roemer, de Effect. Tum. Uteri Fibros., p. 11. Groning. 1837.

* See a paper on these displacements by the Author in the Lancet, December, 1838; and also the article Ectopia in the Cyclopædia of Surgery.

to make the ulcer appear somewhat excavated: the surface bleeds easily in such cases, and the diagnosis is far from a simple matter. Absence of induration and the moveableness of the uterus (no infiltration of adjoining tissues existing to fix it) will connect the morbid state with non-cancerous disease: but an opinion should not be rashly hazarded, until the influence of treatment has been watched for a time.

Corroding ulcer.—Ulceration, primitively simple and disposed to remain superficial in its action, sometimes appears to burrow the tissues deeply. At least, that a disease, to which the term "corroding ulcer of the uterus" has been applied in this country, really exists, and that it may spread extensively without being attended with carcinomatous induration, destroy the uterine tissue, and even lead to perforation of the adjoining hollow viscera, seems, from the strong evidence of numerous judicious observers, incontestable. But of the infinite rarity of such a disease I entertain not a doubt. Availing myself to the utmost of the opportunities afforded in certain of the Paris hospitals for examination with the speculum, I have never observed such destruction without carcinomatous induration. I have doubtless often known simple ulceration extend up the opening of the cervix, but never excavate the uterine structure deeply. Dr. Ashwell's* testimony is to the same effect: out of five hundred recorded histories of female sexual disease treated at Guy's Hospital, he has not found one of "corroding ulcer." The absence of induration and the mobility of the uterus will distinguish the case. The "corroding ulcer" may eventually become complicated with carcinomatous deposition, and that the disease is then undistinguishable in its anatomical characters from ulcerated scirrhus is as certain in point of fact, as reasonably to be expected *à priori*. Bayle taught that uterine cancer almost invariably follows this course, and M. Lisfranc† gives in his adhesion to the doctrine. This variety may be accompanied with cancerous contamination of the lymphatic system. (See Cancer of the Skin.)

Of *tuberculous ulceration* the distinctive sign has been already mentioned.

Primitive gangrene, whether attacking the entire uterus or destroying it layer by layer, may be distinguished by the gangrenous odour of the discharge, and the more rapid course of the disease. Cruveilhier and Andral both describe this affection: the latter‡

* Diseases peculiar to Females, p. 433.

† Clinique Chirurgicale, tom. iii. p. 597. 1843.

‡ Anat. Path., tom. ii. p. 683.

is not persuaded, however, that it consists in true gangrene of the part, terms it putrid softening, and inquires whether it is the same affection as that described by Boer as putrescence of the uterus.

§ XIV. The difficulty of positively distinguishing scirrhus in its very early stage from chronic simple induration would of itself warrant the trial of antiphlogistic measures. But there is a stronger motive for their employment, in the fact that they prove decidedly useful in actual scirrhus.

The use of emollient vaginal injections twice or thrice daily, and of the warm bath (at 96° F.) occasionally, with constant observance of the recumbent posture on a hard mattrass or sofa, the avoidance (except under peculiar circumstances) of all direct and indirect excitement of the genital system,* even of the perusal of works of imagination, the use of mild unstimulating diet, abstinence from wine and spirits, and the use of saline laxatives are indicated. The hip-bath is less advisable than general immersion of the body; but its congestive effects towards the uterus have unquestionably been exaggerated by M. Lisfranc.

Abstraction of blood has its advocates and opponents. Venesection, unless for the removal of some highly inflammatory incidental state, I believe to be perfectly inadmissible,—presuming the scirrhous nature of the disease to be established. Occasional cupping over the loins and sacrum is, on the contrary, a judicious practice, as affording satisfactory relief to symptoms; the female is thus freed of the sensations of weight, fulness, and bearing down, which constitute a large share of her annoyances. But caution is requisite in the employment of this local depletion; the immediate relief it affords, too often leads the practitioner to lose sight of its probable eventual effects; and women are in this disease very readily reduced to a state of irretrievable debility. Free dry cupping should be substituted, where any evidence of failure of strength exhibits itself.

The application of leeches to the pudendum, perinæum or thighs, is a practice to which many practitioners have very frequent re-

* Dr. Beatty (Dublin Med. Transactions) believes he has succeeded in checking the progress of carcinoma by restoring females to their husbands' beds, from which they had been separated by other practitioners. I am persuaded that Dr. Beatty's notion is not destitute of some foundation. There are women whose uterine system suffers greater irritation from abstinence than from indulgence; when this is the case (and the same occurs in some males affected with orchitis), intercourse may be permitted, especially if from age or other causes there be no apprehension of pregnancy, as the lesser of two evils. Should effusion of blood or actual pain follow the act, abstinence becomes, however, imperative.

course. There can be no question, that if a small number be applied (say five or six at a time), the practice increases the determination of blood to the part: one of the most effectual plans of bringing on the catamenia, where tardy in appearing, is by applying leeches on this plan.* Madame Boivin correctly insists upon this practical fact, and the experience of all observers versed in the management of these diseases corroborates her statements. On the other hand, the application of a number of leeches (say from twenty to thirty) sufficient to reduce the plenitude of the uterine system, may produce a degree of debility most injurious to the patient.

On the impropriety of the direct application of leeches to a scirrhous cervix (a plan of which the efficacy in metritis is fully established) I entertain a very decided opinion, derived mainly from considerable observation of the practice in the Paris hospitals. In the first place, the objection made to the external application of leeches, on the score of number, holds good here. Secondly, the operation is disagreeable, troublesome, and distressing to the patient. Thirdly, it is true that the bites are very rarely painful at the time (often indeed they are not felt); but, as has been noticed by Lisfranc and many others, an increase of local suffering and irritation often follows, unless the number applied has been very considerable. Fourthly, Madame Boivin † has known an attack of acute metritis follow the application. Fifthly, serious hæmorrhage, requiring the use of astringents and even the plug, occasionally ensues, especially when the number of leeches applied is considerable: this is, however, more rare in cases of scirrhus than of metritis. Sixthly, the bites have sometimes turned into ulcers of cancerous character.‡

Punctures of the cervix (Dujarric Lasserve), and scarification (Fenner) are utterly inadmissible in cases of scirrhus.

Of compression by means of cupular pessaries it is impossible to hold a decided opinion: the plan has not been sufficiently tried; nor have the mechanical means employed been brought to a sufficiently perfect state to render success probable.

Lisfranc lauds in forcible terms the ergot of rye, administered in doses of from three to six grains with a sixth of a grain of opium, at bed-time; the immediate effects of the drug are, he affirms, mitigation of the pelvic and perinæal pains, and decrease of the discharge, and of the hæmorrhage, if this exist; the more remote

* The application of a few leeches under the clavicle in phthisical people has, within my knowledge, been followed almost immediately by hæmoptysis.

† Diseases of the Uterus, Trans. by Heming, p. 361.

‡ Pauly, Maladies de l'Utérus, p. 141.

effects, improvement of the appetite, &c. The same writer affirms* that he has observed some cases of recovery under the use of iodide of potassium, after the disease had been decided in consultation to be beyond the reach of art.

The remedies to which I should be most inclined to trust, as a general principle, are the iodide of arsenic taken internally, and iodide of lead in the form of ointment, smeared upon the cervix. I have sufficiently dwelt on the claims of arsenic generally, and the observations of Mr. Hunt† give them special importance in the case of the uterus. The testimony of Dr. Ashwell to the efficacy of ioduretted applications is extremely strong. If the cervix be low, the patient herself may perform the inunction with the finger.

In cases of ulceration with only *superficial* induration, cauterisation occasionally produces very beneficial effects, alleviating the local and general symptoms, even when it fails in checking the progress of the ulcer. If the case be of a kind to justify the practice, it should be repeated every fifth or sixth day, otherwise it excites increased activity in the disease. The usual mode of operating is as follows: The speculum having been introduced, the cervix is cleaned with some shreded lint attached to a thin rod, and, if slight effusion of blood follow, this is stopped by gentle injection of cold water; the ulcerated surface is then lightly touched with a camel's hair brush, wetted with a very small quantity of caustic, and cold or tepid water injected to prevent the action of the escharotic extending beyond the parts which it is intended to reach. The majority of French cauterisers use the acid proto-nitrate of mercury (p. 218); some employ a cylinder of caustic potass. The warm bath is used after the operation; and, if necessary, cold irrigation of the hypogastrium practised to control inflammatory reaction.

Accidents of most serious character sometimes happen in spite of the precautions just detailed. Madame Boivin refers to a case in which the recto-vaginal septum was destroyed by caustic potass; Professor Marjolin to another in which inflammation, and partial occlusion of the vagina, followed the fall of a few drops of liquid caustic into that canal. In another, symptoms of poisoning appear to have been induced by the acid nitrate of mercury, and salivation is not an infrequent consequence of its use. The nitrate of silver is said by Lisfranc to cause frequent return of the catamenia; but is notwithstanding perhaps the safest escharotic. Used as a means of modifying the vitality of ulcerated surfaces, cauterisation

* Clin. Chir., tom. iii. p. 625. † Med. Chir. Trans.

I have frequently seen productive of at least temporary suspension of ulcerative action. The practice is only admissible, when the indurated basis of the sore is extremely thin and superficial: the project of burning away cancerous substance in this situation layer by layer, although some few cases of alleged success may be cited in its extenuation, is as unwarranted in theory as by experience.

Palliation becomes the only resource in the advanced stages of the disease. When ulceration has set in, perfect cleanliness must be carefully preserved; frequent sponging, constant change of linen, and the use of vaginal injections are indispensable. In the administration of these much gentleness is requisite; and especial care should be taken that the end of the instrument employed shall not come in contact with the cervix. Warm or tepid water (medicated according to the indication with emollient, sedative, anodyne, or astringent preparations) should be gently injected two or three times daily, the patient being in the recumbent posture, with the pelvis raised upon pillows. M. Lisfranc recommends the introduction of the speculum with the view of facilitating the advance of the injected fluid to the cervix,—a plan open to numerous objections. Dr. Montgomery, with the same intention, advises the use of a bent glass or metal tube of about an inch in diameter in its vaginal part, which latter the patient introduces for herself: this instrument possesses all the advantages of the speculum, and none of its disadvantages. Astringent medicines thus employed (nitrate of silver, alum, acetate of lead, catechu, decoction of oak bark, sulphate of zinc, &c.) frequently lessen the abundance of the discharge. Hæmorrhage requires cold applications to the vulva, enemata of iced-water, or the administration of acetate of lead, secale cornutum, &c.; plugging the vagina may become necessary. But the gushing character of the hæmorrhage often renders it, as Dr. Ashwell has well remarked, excessively difficult of management.

Pruritus of the pudendum is occasionally one of the most distressing symptoms, and demands, not only on this account, but from the irritation it keeps up in the vicinity of the diseased organ, the attention of the practitioner. Lisfranc, speaking of it as a symptom of uterine disease in general, recommends small bleedings from the arm, the warm bath, lotions with bran-water or Barrèges water, and has even known it resist sulphur fumigation. I have succeeded in removing this species of suffering by inunction with acetate of lead and hydrocyanic acid, when numerous other means (and the same ingredients in the form of lotion) had altogether failed. The fœtor of the discharge may be removed or

diminished by the alkaline chlorides, or by a weak solution of nitrate of silver, or of creasote.

Pain is to be relieved on the general principles elsewhere laid down; should it be distinctly intermittent, quinine will check, if not remove, it. Opiates are most useful in the form of vaginal injection, enema, or suppository. The endermic use of morphia may be had recourse to as a means of varying the mode of exhibition of anodynes; but, as already mentioned (p. 222), I have no experience of the practice in cancer.

Constipation is, for obvious reasons, an important evil at whatever stage of the disease it occurs: in the commencement laborious defecation tends, as a necessary consequence, to displace the uterus. Such laxatives as are found to maintain a regular alvine action, without irritating the intestinal canal, are those indicated. Nausea and vomiting may be relieved by effervescing draughts, aromatics, blisters to the epigastrium, and creasote with stramonium. If the administration of enemata be entrusted to a skilful person, there can be no better mode of ensuring regular evacuation; but roughness or ignorance may lead to very serious consequences; as, for example, perforation of the rectum and peritonæum, an occurrence of which I have myself observed an example. When the intestine is itself cancerous, the introduction of the tube becomes still more delicate and dangerous, and, unless there be some particular indication, had better be abstained from, at least as a general plan: indeed, the patient commonly refuses to submit. In cases of difficult micturition, the catheter must be employed.

According to Baudelocque, Lauvariol proposed the amputation of the neck of the uterus in 1780; Wrisberg spoke in its favour in 1787, and Monteggia in 1788; Osiander achieved the operation in 1801; Dupuytren and Recamier subsequently frequently performed it in France; and Canella invented a "metrotome" for its execution, and strenuously advocated its propriety in 1821. But it had fallen into disuse, when, in 1825-26, M. Lisfranc drew general attention to its claims by announcements of extraordinary success.

M. Lisfranc referred the profession to 99 cases of operation; of which 84 had, as he averred, terminated by cure. Circumstances led various persons to doubt the perfect accuracy of the statement; and M. Pauly,* after laborious investigation of the whole matter, has published the following analysis of M. Lisfranc's practice. "1.

* Op. cit. p. 472.

Of 99 operations referred to in June, 1834, by M. Lisfranc, 53 only (with the addition of those performed in the interim) could be made out in January 1836. 2. There is no positive account to be had of the failures occurring in the hospital. 3. Of 19 private patients, 1 only continues now (fifteen months after the operation) to be benefited by it. 4. Of these 19 patients, 4 died within twenty-four hours after the operation, 12 had an immediate return of the disease, and in 2 the carcinoma, having been imperfectly removed, only advanced with the greater rapidity. 5. Of 9 patients operated on in my presence, and with whom I remained twenty-four hours, 6 suffered from tremendous hæmorrhage, and 3 of these died within the twenty-four hours." Besides all this, the difficulties of the operation are sometimes extreme; M. Lisfranc, whose dexterity is incontestable, has cut into the peritonæum. And it is sometimes almost impossible, even at the expense of much suffering to the patient, by forcible plugging, to stop the hæmorrhage. Osiander and Dupuytren ceased altogether to perform it, before the close of their career; and for some years M. Lisfranc himself has seldom ventured on its repetition.*

Drs. Ingleby and Simpson† have successfully performed the operation in this country.

Extirpation of the entire uterus is a proceeding which finds its advocates. It has been had recourse to with the following results. In 18 out of 21 instances of removal of the organ *in situ*, almost immediate death followed; in one only did the patient survive more than a few months. Less disastrous results have been obtained, when the uterus was *prolapsed* before extirpation.‡

* It is important to observe, that M. Lisfranc makes no attempt in his most recent publication to controvert the exposure of M. Pauly; but limits himself to denouncing the Judas-like character of the act. (Clin. Chir., t. iii. p. 667. 1843.)

† Edin. Med. and Surg. Journal; March, 1841.

‡ I have not spoken in the text of the so-called "*cauliflower excrescence*," because I feel undecided as to its nature. This excessively rare variety of uterine product is *clinically* distinguished by its granulated feel, its mobility, looseness and softness; by its painless and slow progress, attended with *profuse watery* discharge, becoming occasionally hæmorrhagic; by the absence of lymphatic enlargement, and of hardness at its point of attachment; and by the existence of intense anæmia, unaccompanied with fever. But, *pathologically*, is this affection essentially other than a modification of encephaloid? I believe not. I have had cognizance of no few cases like that of Mr. Elkington (Provincial Med. Journ. Feb. 1844), in which *all the special symptoms and signs* of "cauliflower excrescence" had existed during life; the shrunken growth was, after death, found to be pulpy and cerebriform, and the uterus itself the seat of unconnected cancerous formation.

SECTION VI.

FALLOPIAN TUBES.

The Fallopian tubes are sometimes involved in carcinoma, spreading from the uterus. Boivin and Dugès have never seen them primarily affected; Dr. R. Lee, however, affirms that the disease may originate in this situation.

SECTION VII.

RECTO-VAGINAL CELLULAR TISSUE.

§ I. The structure between the adjacent walls of the vagina and rectum gives origin in some very rare cases to true scirrhous growths, less unfrequently to encephaloid masses. Boivin and Dugès have figured a remarkable example of prolapsus of the vagina, which being at first mistaken for prolapsus of the uterus and treated with the pessary, the displacement returned; and, the pyramidal form of the prolapsed parts suggesting the idea of "polypus," a ligature was applied. The prolapsus recurred a second time; and the application of a second ligature was followed, as that of the first, by the separation of an enormous tumor. A third mass of the same kind followed; all three within the space of a month. The nature and seat of the disease were at length understood: an enormous mass of pulpy encephaloid grew from the recto-vaginal septum.

§ II. The mechanical effects of such growths upon the functions of defecation and micturition (but far more the former) give additional suffering to the ordinary train of misery in cancerous diseases. Should pregnancy occur, it will become a question, whether premature labour should not be induced: upon all points referring to this question Dr. Ashwell's volume should be consulted.

§ III. The distinctive signs of encysted, cholesteatomatous, fibrous, and cancerous tumors (all of which occasionally form in this locality) are ill-defined. The effects of all (previously to ulceration) are chiefly mechanical; lancinating pain has sometimes been early developed in cancerous cases.

CHAPTER VII.

CANCER OF THE BREAST AND APPENDAGES.

Cancer affects the breast of both sexes; but with such disproportionate frequency, that while this organ, in the female, holds the third (in some countries probably the second) place among all the structures of the body in respect of proneness to cancerous disease, the male breast is affected with excessive rarity. The Paris Registers for ten years supply 1147 deaths among the female population from cancer of this structure, 5 among males: respectively 13·83 and ·06 per cent. of the total deaths from cancer of specified seats. This fact (as well as other circumstances which will appear in the sequel) renders it necessary to describe the disease in the two sexes separately.

SECTION I.

FEMALE BREAST.

§ I. Cancer is by far the most common of the organic affections to which the breast of the female is liable; to such an extent is this true, that the fact may be made available in certain difficult cases as an element of diagnosis.

§ II. Cancer of the breast is either solitary or associated. It remains to the last the sole local evidence of the disease in a certain proportion of cases,—a proportion which may be considered somewhat higher than that already (p. 101) calculated for cancer in general.

When associated with other cancers, that of the mamma is, as far as my experience goes, invariably primary, unless in those rare cases wherein the disease spreads from the lymphatic glands or superjacent skin. It would appear, however, that in some exceptional instances, observed by others, the development of mammary cancer has followed in the train of cancerous disease of distant parts.

§ III. Scirrhus is incomparably the most frequent species of cancer in the breast; encephaloid occurs in rare cases; while colloid, especially as constituting the mass of a tumor, is excessively uncommon.

The general description of scirrhus is perfectly applicable to the disease, when seated in the breast. The peculiar appearance, depending on thickening and enlargement of lactiferous ducts, has been already referred to (see Plate I. fig. 9, and p. 21). The several varieties of the species all occur in this organ.

The varieties of encephaloid, or soft cancer, which I have seen in the breast, are the true cerebriform, the solanoid, the hæmatoid, the nephroid, and fungus hæmatodes. Encephaloid vegetations of various shapes sometimes originate in the walls of multilocular cystoid growths (I have not myself observed them in connexion with simple cysts), and increase the irregularity of outline of the general mass. Encephaloid also occurs perfectly independently of any pre-existing cystoid structure; a fact showing that the opinion of Mr. Travers, assuming the cystoid "as the primitive form of medullary cancer when it appears in the region of the mamma," is erroneous from its exclusiveness.

Of colloid cancer I have seen two perfect specimens: the one (see Plate II.) exhibiting the characters of the production when found in an extensive basis of fibriform structure; the other constituting a mass of equable consistence and uniform proportions in all directions, and exactly resembling the growths much more commonly met with in the omentum. More frequently have I observed small patches of colloid in the midst of scirrhi, the special characters of each growth retaining all their distinctness.

I need not recur, in the present place, to the views already (p. 24) taken of the nature of Müller's Carcinoma reticulare, which is frequently met with in the breast.

§ IV. Cancer is very commonly confined to one breast, the left being the more frequent sufferer. Among 102 cases, partly extracted from books, partly having fallen under my own observation, I find the disease to have been limited to the left breast in 59, to the right in 39, while it implicated both organs in 4 only. In cases where both organs are affected, the disease attacks one consecutively to the other; I do not recollect to have seen, or read of, an instance of the disease commencing in both simultaneously. Sometimes the two breasts are connected by indurated absorbents, or a chain of small cutaneous scirrhi.

§ V. The axillary border of the gland is the most common seat of the tuberous form of scirrhus; the infiltrated form of the disease varies in its localization with the element of the gland affected.

§ VI. Of the nodular or tuberous and infiltrated forms of cancer the latter only requires special anatomical consideration.

Infiltration of scirrhus may commence in any one of the chief component structures of the gland. (*a.*) When it originates in the cellular laminæ dividing the lobes of the gland (*ramose* variety of Velpeau), an unequal, hard, ill-circumscribed tumor, which terminates insensibly in radiating indurated bands among the adjoining cellular membrane, is the result. In these cases it is almost impossible to assign accurate limits to the disease, as the bands in question extend sometimes even to the axilla, or twist under the border of the pectoralis major; the importance of tracing them to their apparent termination in extirpating the disease has justly been insisted on by a number of writers. (*b.*) In other cases infiltration commences by the proper lobules of the gland. A knotty mass, curiously wrinkled on the surface, is the result; it is moveable, extremely firm, occasionally well-circumscribed, and appears composed of a multitude of small indurated granules, whence it has been termed *granulated* by Mr. Travers. (*c.*) The main lactiferous ducts, and cellular membrane connecting them,—in other words, the vicinity of the nipple, —may be the chief seat of morbid deposition. M. Velpeau refers to a few cases of this kind observed by himself, wherein the tumor was flattened from before backwards, not very painful, half as large as an ostrich's egg, slightly tuberculated, and non-adherent. On section it was found to consist of ordinary scirrhus, speckled with small spots like granite, and presenting a number of minute open orifices filled with caseous matter. This is the apinoid variety of scirrhus. Here it is that sections of the morbid structure exhibit most distinctly and fully the appearances produced by thickening and dilatation of the ducts. (See Pl. I. fig. 9.)

§ VII. The general character of the three species of cancer in respect of size prevails in the breast. Encephaloid sometimes attains great bulk, though never the enormous magnitude occasionally witnessed in the limbs. Proper scirrhous tumors do not exceed an orange in size; but infiltrated masses of the disease acquire greater dimensions. Mr. Travers observes that the *glandular* infiltration, because most commonly developed in full-breasted women, may attain a large size, and my own experience corroborates the statement; of the volume of the breast generally I shall presently speak.

§ VIII. The local morbid changes observed are, enlargement of glands, obstruction and distension of the veins, induration of the adjacent cellular membrane, cancerous infiltration of the skin; besides these, others already (p. 85) described ensue, and from the peculiar circumstances of situation, &c. of the gland produce special

external appearances, to be again referred to. As respects the state of the breast generally, the *atrophous* and *hypertrophous* forms of the disease are both observed in the mamma. The former is most common in subjects of advanced age; its progress is usually slow. M. Cruveilhier relates a case showing the extreme degree to which the atrophy may advance; here the skin, cellular tissue, mamma, and a stratum of the pectoralis muscle, were converted into a stony mass only half an inch thick. I have, on the other hand, known the affected breast nearly double the size of the sound one. In estimating this point, it must not be forgotten that one breast (the right most frequently, according to my observation) is in not a few women naturally larger than its fellow.

§ IX. The non-cancerous breast may, and commonly does, retain to the last its natural character. I have known it suffer from atrophy, but never become hypertrophous. But the age at which scirrhus commonly occurs, explains this, and strengthens, instead of weakening, the general law. In some instances both breasts become cancerous, as has been seen; and the implication of the second may be an evidence of extension of the diathesis; or be produced by direct lymphatic communication (a chain of enlarged absorbents with small cutaneous nodules visible from place to place connecting the two mammæ); or be the result of general secondary contamination of the system.

§ X. The lymphatic system suffers early; and the axillary, supra-clavicular, and post-sternal glands are those generally affected. At first, their enlargement may be simply irritative. The disease extends to the cellular membrane, the skin, the muscles, and the ribs; the latter are sometimes found cancerous, while the intervening muscular substance continues sound. Stratiform cancer of the pleura, or sub-pleural deposition in patches, is far from uncommon; and secondary nodular growths in the lung not much less frequent. Secondary cancers are certainly more common in the lung than in the liver; but I have myself seen cases where the former had escaped, and the latter suffered contamination. The bones of the spine or extremities occasionally become the seat of deposition, either nodular or infiltrated. Secondary cancer of any part of the genital system is, at the least, excessively rare.

Evidences of hydrothorax, inflammatory pleuritic effusion, pulmonary œdema or pneumonia, are occasionally observed. The cartilages of the ribs of the affected side sometimes ossify, or become encrusted with saline matters; those of the other side retaining their natural appearance.

§ XI. The question of the causes of mammary cancer merges in that of the etiology of the disease in general. It is said to be more frequent in women who have not borne children, whether married or single, than in mothers, and its evolution connected with the disappearance of the catamenia: the former proposition requires stronger proof than has yet been given by its advocates, before it becomes entitled to general confidence; of the latter I have already (p. 151) sufficiently spoken.

I have failed in collecting statistical evidence on a sufficiently large scale to decide with precision the period of greatest frequency of the disease in the female breast, or the influence of age on its production. Although Mr. Carmichael has seen scirrhus of both mammæ in a child aged twelve, and Everard Home relates an instance in which it commenced at the age of fifteen, its occurrence before thirty is extremely uncommon. On the other hand, persons of the most advanced age are not exempt from the chance of its development: I have had a female aged nearly seventy under my care; Sir A. Cooper has seen the disease in an individual aged eighty-six; and Cruveilhier (who has had extensive experience amid the aged inmates of the Salpêtrière) maintains that such facts are of almost too frequent occurrence to be looked on as exceptional. Mammary encephaloid of the most acute character has been witnessed at the age of eighty-two years.

§ XII. (*a.*) When carcinoma occurs in the nodular form (much the more common of the two possible forms), and is superimposed, as it were, on the surface of the organ in a nidus of cellulo-adipose structure, it first attracts attention as a small, rounded, circumscribed induration, smooth on the surface, rolling more or less freely under the fingers, and most commonly seated towards the axillary border of the gland. At the outset it is not only the source of no pain, but is not productive of real inconvenience of any kind; to such a degree, that, generally speaking, it is accidentally discovered by the patient in dressing or washing. When first detected, the size of the nodule commonly varies between that of a pea and a nut. It is insensible, when pressed upon; but often becomes the seat of pain shortly after having been handled.

As the small tumor advances in growth, its surface becomes finely and sharply tuberculated, knotty and uneven. It loses its moveableness, becoming gradually more and more fixed; this change is produced either by the occurrence of simple inflammatory exudation into the surrounding textures (which sometimes early leads to incipient adhesion to the skin); or by the spread of cancerous in-

filtration to the proper glandular structure; or by both these causes combined. Under the influence of the two latter especially, the characters of the nodular form of the affection now resemble, as far as the substance of the mamma is concerned, those belonging, from the first, to the infiltrated variety.

(*b.*) In the infiltrated form, the carcinomatous matter, pervading the lobules of the gland *ab initio*, gives an uneven, nodose outline to the affected part of the breast, gradually increasing the weight, density, and size of this organ: it never constitutes a distinctly superadded tumor.

However the disease originates, the resulting tumor, at first sunk in the general adipose and cellular substance of the breast, gradually becomes prominent. The superjacent skin, slowly growing adherent to the diseased organ, is eventually consolidated into one mass with it and the intervening cellular membrane. The skin, at first of a more dead-white colour, and more shining, than natural, acquires a reddish-brown or livid hue, and a mottled aspect. These changes depend in some measure upon dilatation and varicose enlargement of the superficial veins. The nipple meanwhile begins to lose its natural prominence, and eventually sinks more or less deeply below the level of the surrounding skin; the latter becomes furrowed or puckered. The mode in which this subsidence of the nipple is effected differs in different cases. (*a.*) When the lactiferous tubes and interjacent cellular membrane have escaped infiltration, it mainly depends upon the simple enlargement of the other parts of the gland pushing the skin around the nipple forwards, while the nipple itself, bound down by the inextensible ducts, continues to hold its natural relationship to the gland. (*b.*) In other cases the tissue connecting the lactiferous tubes is the seat of common exudation; the plastic matter exuded contracts and draws in the nipple actively, while that matter, by its passive resistance, increases the influence of the first-mentioned cause. (*c.*) The structures connected with the lactiferous ducts sometimes undergo atrophy, while the other portions of the gland retain their natural bulk, or enlarge: sinking of the nipple is a necessary result. (*d.*) Simple thickening of the subcutaneous tissue surrounding the nipple or cancerous infiltration of that texture and the skin itself, sometimes give an appearance of depression to the part in question. Of all these causes the two first are the most effectual and common. Occasionally at an early period of the disease and long before the nipple falls in, slight dimpling of the skin may occur over some part of the breast. This sort of depression I have known to be quite invisible, unless when the arm of the affected side was raised up.

The skin corresponding to the most prominent part of the morbid growth undergoes a series of changes preparatory to ulcerative destruction, and at last gives way. A fissure is the common form of opening first produced; from it exudes a serous fluid, more or less clammy, commonly encrusting over the orifice, while this spreads underneath into an ulcer. The ulcer assumes the characters of the cancerous sore; burrows into, or more rarely creeps superficially along, the implicated textures; gives origin to soft or hard vegetations; becomes the seat of hæmorrhage; and, in a word, exhibits successively the usual phenomena of cancerous destruction. In some instances the formation of a serous bleb, more or less prominent, precedes the establishment of ulceration.

The course of the disease, in respect of the skin covering the breast, is commonly such as I have a moment since described it. But in certain cases the cutaneous affection assumes unusual importance. Thus the skin sometimes undergoes cancerous infiltration coevally with, and as it were independently of, the subjacent structure; or the disease actually commences in the cutaneous texture. The natural suppleness, elasticity, and colour of this tissue are lost; it acquires a dusky brownish hue and coriaceous hardness, becomes at a variable period studded with pea-like scirrhous excrescences (most commonly of the leucoid and mollusciform varieties according to Rayer) which successively undergo superficial abrasion; these minute ulcerations extend, become continuous, and form a single wide-spread ulcer. This variety may commence in the nipple.

Or, again, the disease may originate in the glandular structure, and, without having led to softening or destruction of this, transfer itself to the skin, and in its new seat acquire all the importance of a primary affection. I had frequent occasion some time since to see a case of this class in consultation with Mr. Langley. In this patient, aged about forty, the mamma was as hard as stone, the skin shining, marble-like, and studded with excrescences;—this condition of the skin extended to the shoulder and neck, impeded the motions of the arm and side, as well as the respiratory expansion of the chest. Pleuritic effusion (simple), with anasarca of the upper arm to a most painful extent, terminated the patient's miseries.

I lately saw a lady labouring under scirrhus of the mamma in the atrophous form, in whom the progress of destruction was very peculiar. Ulceration had spread in surface, but not in depth; the exposed surface looking simply raw, as though under the influence of a perpetual blister: but the nipple had wholly disappeared.

The disease may originate in the axillary glands.*

§ XIII. The local symptoms of cancer developed within the mamma are few in number. The functional class is, for obvious reasons, completely deficient.

The *pain* endured is of more than average severity; and I have never known a case in which it was totally absent, though more or less perfect intermissions are not uncommon. The period of its first occurrence is variable; and the statement, that the outset of pain dates from the establishment of softening, contradicted by daily experience. The patient is said to feel more acute suffering before each catamenial period, and undoubtedly this is sometimes the fact. But, on the other hand, the reality of such exacerbation is totally denied by some patients; and it has occurred to me to observe two cases, in which freedom from pain in the breasts, previously habitual at each monthly period, was distinctly noticed after the formation of a scirrhous mass in one of those organs.

The occasional discharge of a small quantity of blood or serosanguineous fluid by the nipple is sometimes a symptom of early occurrence, and may become useful in a diagnostic point of view. I have only noticed this symptom myself in cases where the new formation was seated amid the lactiferous ducts. The flow of blood is said to become, in some cases of general cancerous infiltration of the gland, sufficiently abundant to replace the menstrual discharge at the critical period.

The obstruction of the lymphatic system and of the veins leads, in not a few cases of advanced disease, to œdematous swelling of the hand, fore-arm, arm and shoulder; in extreme instances this œdema extends to the lateral parts of the trunk and lower limb. Commonly sufficiently soft, though tumid, the anasarcous parts sometimes become excessively hard, the cutaneous papillæ and the cutis generally become prominent and thicken,—whence an appearance ensues somewhat resembling that existing in elephantiasis Arabum. This cutaneous affection is sometimes complicated with frequent attacks of erysipelas, each of which permanently increases the size and hardness of the limb. It may constitute the chief source of suffering, and exercise all the endurance of the patient and ingenuity of the medical attendant. In such cases complete obliteration of the superficial and deep-seated veins of the axilla has been discovered.

The cachexia commonly exhibits itself in an intense degree; but there is little that can be considered peculiar to it in connexion

* Smith, Dublin Journ., vol. xii.

with this organ. The catamenia may continue regular till the close of life almost. Thoracic symptoms, cough, oppression of the chest, and dyspnœa, are observed in a certain number of cases. Leucorrhœa of fœtid character, but quite independent of structural disease of the uterus, may attend the closing stages; connected with this discharge is severe pain in the loins, and over the sacrum and coccyx. The development of cancer in the bones is sometimes attended with most severe suffering in those structures; hence acute pain in the region of the spine and in the limbs. Sudden paraplegia has been observed by Sir B. Brodie in a case, where several of the dorsal vertebræ were found converted into cancerous substance. (See Cancer of the Spine.)

§ XIV. The opinion of Sir Astley Cooper, that scirrhus of the breast occupies from two to three years in growing, and from six months to two years (after it has attained its full growth) in destroying life, is probably not far from the general truth.

Cases may be divided into chronic and acute. In the former class years may elapse before adhesion of the diseased gland to the skin is effected, and even after this event the advance of destruction may be slow. In the latter class, adhesion is rapidly accomplished, the skin suddenly becomes deeply and extensively implicated, the parts swell almost visibly from day to day, while the sharp and throbbing pain almost simulates that of abscess; but ulceration soon occurs, and reveals the nature of the malady. M. Roux* has known the total duration so short as three months. Ulceration once established, the progress of the disease is generally rapid. But rare cases are not wanting in which either a positive suspension of the malady, or at least a slowness of progress almost amounting to this, has followed the establishment of ulcerative action. (See p. 136.)

As a general fact, scirrhus of the breast is of slowest progress when developed in old age. But exceptions to the rule occur, and have fallen within my own observation, both in regard of rapid advance in aged persons, and of the contrary in comparatively youthful females.

Mr. Travers and others affirm that the progress of the disease is retarded by pregnancy. In a woman under my observation at this moment, the very reverse is the fact.

Encephaloid of the breast runs an average course of from six to twelve months, according to the estimate of Velpeau. It is distinguished from scirrhus not only by its own intrinsic characters,

* Mélanges de Chirurgie, p. 165.

but by being less disposed to become adherent to the deep-seated parts, less prone to cause enlargement of the axillary glands, and by the less amount of pain it causes previous to ulceration.

§ XV. In the majority of fatal cases death occurs before the total destruction of the mamma ; in others the ulcer extends from the axilla to the lower border of the pectoralis muscle, or even downwards towards the flank, while its base is formed of the thickened pleura and ribs. The discharge, and hæmorrhages, occurring from time to time, reduce the patient's vital powers to the lowest ebb, and she sinks at last under the influence of the cachexia alone. Death is, however, not uncommonly accelerated by inflammatory effusion into the pleura, or by simple hydrothorax, accompanied with more or less pulmonary œdema, and with or without cancerous patches under the pleura. Aged women, who die from causes independent of their cancer, frequently perish from pneumonia. The latent character of inflammatory affections in old persons points to the necessity of ascertaining the physical state of their chests, when the least suspicion of pectoral disease arises.

§ XVI. Although no single character suffices to distinguish a scirrhous tumor from certain other diseases to which the mamma is liable, yet a combination of the signs described will usually ensure tolerable certainty of diagnosis. If a hard, moveable tumor, free from pain, of small size, insensible under immediate pressure, but becoming painful a short while after manipulation, and having originated without apparent cause, has existed in the breast of a female, aged thirty or upwards, for a certain period,—say from six months to a year,—the probability is strongly in favour of its being cancerous. This probability will amount to positive certainty, if either previously to, or at the end of, this period, lancinating pains alternating with perfect freedom from suffering supervene, and hæmorrhage occur from the nipple, while the disease resists local antiphlogistic and discutient measures. The state of the general health will commonly facilitate the diagnosis ; but too much stress may very easily be laid on the absence of constitutional disturbance. I have seen tumors, of which the truly scirrhous character was anatomically demonstrated, removed from persons whose general health was excellent ; and it has been remarked by a close observer, Bayle, that women sometimes become apparently even healthier, than they had previously been, during the incipient stage of mammary cancer. The signs of encephaloid growth in the breast, if combined in any number, can rarely mislead.

Correct diagnosis in cases of disease of the breast is for many

reasons peculiarly desirable; I shall consequently pass in review the distinctive characters of the chief affections with which confusion is possible.

(*a.*) *Neuralgia of the breast*, if unaccompanied with distinct tumor, or with general tumidness of the part, cannot for a moment (unless by the sufferers themselves) be mistaken for cancerous disease. When there is coexistent tumor, error will be avoided by considering that in neuralgia, while the general health does not suffer, the breast is excessively painful and tender; intercostal neuralgia is often present; there is generally more than one tumor or induration; these nodules attain small size only, are very slow in enlarging, and are often seated quite close to the skin; the axillary glands do not swell; there is generally spinal irritation; and lastly, the affection is almost peculiar (absolutely so, as far as I have seen) to persons who have reached puberty, and not passed the thirtieth year, or thereabouts. The complaint is not (as has been asserted) confined to hysterical women.

(*b.*) *Atrophy of the breast with induration* might be mistaken for the atrophous form of scirrhus. But the natural atrophy of age affects both breasts; the gland continues moveable; the condition of the skin and axillary glands remains unchanged, and the relations of the nipple are those of health; there is no pain, nor does the constitutional state indicate local disease.

(*c.*) *Accumulation of calculi in the lactiferous ducts*, an excessively rare state, is distinguishable from scirrhous formation around those ducts by the history of the case distinctly connecting the affection with suckling, and even in some cases with stoppage of milk. It has been said, too, that sound may be produced by collision of the calculi.

(*d.*) *Simple chronic induration* gives a solid resisting feel and knotty outline to the parts it affects, and might be mistaken for infiltrated scirrhus. But the skin, nipple, and glands remain unimplicated; the affection makes very slow progress, and is productive of little or no suffering; the general health undergoes no impairment; the origin of the morbid state is traceable to inflammation, for which, in its turn, there has commonly been an obvious cause; and lastly, the disease is much more amenable to treatment than scirrhus.

(*e.*) *Chronic abscess.*—Breasts have been cut into by the most practised surgeons under the idea of their being cancerous, when, in fact, a collection of pus was the only morbid condition present: the occasional difficulty of the diagnosis is consequently obvious. The absence of affection of the skin and lymphatic

glands, the slight derangement of the general health, the comparatively slight suffering in chronic abscess, and sometimes very distinct fluctuation, afford aid, especially taken in connexion with the history of the case; but, should doubt remain, the exploring needle ought to be used.

(*f.*) *Fibrinous tumors.*—I have never seen a fibrinous tumor, properly so called, in connexion with the mamma; but M. Velpeau* has called particular attention to them in a description, in which masses of very various characters are comprehended. A fibrinous mass would convey the impression of sponginess under examination; might be traced to a blow, or, perhaps, to suppression of the catamenia; and would neither affect the skin, produce adhesions, lead to deformity of the nipple or enlargement of the lymphatic glands, nor disturb the general health.

(*g.*) *Encysted accumulations of fluid blood.*—I have been made acquainted by Mr. Clapham with the particulars of a case in which accumulation of blood went on for years in the substance of the breast of a young female. When the resulting tumor, as large as an orange, was punctured, pure blood escaped. The cyst (for such it must have been) remained quiet for a time after the little operation; subsequently accumulation of blood recommenced. Doubtless some of the varieties of cyst to be spoken of presently originate in this manner.

(*h.*) *Tuberculous accumulations* (so-called scrofulous tumors) in the breast are exceedingly rare,—in the pure state perhaps unknown. Tuberculous matter has been found, it is alleged, (A. Cooper; Velpeau,) in composite tumors. The marks of scrofulous constitution, the state of the lymphatic glands generally, and above all (in all probability) of the lungs, will disclose the nature of the affection. Of tuberculous abscess, with sinuses and destruction of the substance of the mamma to a certain extent, I have seen some examples in young females, whose lungs were, notwithstanding, perfectly sound.

(*i.*) *Cysts.* I. *Simple.* (1.) *Solitary.*—The mamma is, though rarely, subject to the development of simple isolated cysts, with serous or mucilaginous contents. They have been operated on as cancers;† from which they may be distinguished by the following characters. They may almost invariably be distinctly traced to a blow, sometimes immediately followed by ecchymosis: they may occur in very young persons, and generally enlarge slowly, but

* Dict. de Médecine, 2e édit. tom. xix. p. 77. Paris, 1839.

† Cruveilhier, Essai sur l'Anatomie Pathol., tom. i. p. 264.

sometimes rapidly; in either case, without pain. When handled, the tumor appears produced by enlargement of one of the lobules of the gland, and conveys an impression of elasticity under pressure, similar enough to that of encephaloid growths; but the integuments are perfectly natural in respect of colour, consistence, and thickness; the axillary glands unenlarged, and the nipple maintains its natural appearance. Besides, scirrhous growths rarely, if ever, acquire any size without affecting the substance of the gland by infiltration; while the tissue immediately adjoining a simple cyst may be, and commonly is, perfectly free from induration. The solitary simple cyst may acquire large dimensions (that of a child's head), and this in the course of so short a period as a year; may occur in the breast of the male; present the transparence of hydrocele, and be curable like this affection by irritating injections. Of these facts a remarkable case, which occurred in the practice of Velpeau (loc. cit., p. 104), furnishes valuable illustration.

A rare species of pseudo-cyst met with in the breast originates in the dilatation of one of the lactiferous ducts from obliteration of the duct and accumulation of a milky fluid. The seat of the enlargement in respect of the nipple, the existence of fluctuation, and the signs described as existing in other cysts, coupled with its being developed in connexion with parturition or lactation, will prevent error as to its nature. Thus originate the calculous collections already spoken of.

(2.) *Clustered.*—Clusters of cysts, perfectly independent of each other, separated by healthy tissue, of various sizes, from that of a pea to a hen's egg, or even larger, varying in number from five or six to twenty, occasionally form in the substance of this organ. The size which the resulting mass has commonly acquired before medical advice is sought, precludes the likelihood of its being mistaken for scirrhus. The points of resemblance to encephaloid tumors, however, are not a few. Like these, clusters of cysts acquire large dimensions; they have an irregularly tuberous outline, and a doughy, elastic feel, with sometimes a certain degree of fluctuation. But, unlike encephaloid growths, they enlarge without becoming painful, in some cases *suddenly;* the integuments investing them retain their natural characters; they are not permeated by enlarged veins, as are encephaloid masses, and the tumor is easily moveable; the health of the patient remains unaffected. The tuberous prominences on the surface are commonly smaller and more numerous than the superficial lobular masses of an encephaloid tumor, and more evenly rounded; the axillary glands and

nipple continue unaltered. This is one of the morbid states described under the title of "hydatid breast" by Sir Astley Cooper and Dr. Warren. The work of the latter contains a very excellent case under the head of "Incipient Hydatidal Tumor of the Breast," in which the gland was indurated so generally from the multitudes of minute cysts it contained, and from thickening of its interlobular structure, that considerable difficulty arose in determining the nature of the affection. Here, too, the tumor was immoveable.

II. *Compound.*—Of the two main varieties of compound cyst —that in which the secondary sub-cysts protrude into the cavity of the main cyst, and that in which they enlarge in the substance of the walls of pre-existing cysts, without exhibiting much tendency to encroach upon the cavity of these, the true *multilocular* variety—the former only is of at all frequent occurrence in the breast. In this organ, too, it so rarely occurs without being extensively associated with solid matter, that I shall consider its diagnosis with that of cysto-sarcomatous tumors. Where a *multilocular* compound cyst existed, the diagnostic marks would be perfectly identical with those of tumors composed of simple cysts in clusters. The distinction of clustered simple cysts from the multilocular cyst is not always easy; but success in this diagnosis is not a matter of practical importance, as ablation is the sole—and a safe and certain—cure for both. But the distinction between these and the solitary single cyst is a matter of real importance, if, as Velpeau's case would lead us to believe (the case was not under observation sufficiently long to enable us to affirm this) the latter may be cured by simple injection.

III. *Cysto-sarcomatous tumors.*—The association of solid matter with compound cystic growths is, as I have just said, extremely common in the mamma. This solid matter may consist simply of fibrous substance, associated with ossiform or calcareous deposition, in the walls of the cysts; in which case its formation is evidently secondary in point of time and importance: or it may constitute the greater part of the growth, and then demand special attention pathologically and practically. Such tumors are distinguishable from scirrhus and encephaloid by the absence of change in the skin, of adhesions of the integuments, often of enlarged veins, of swollen axillary glands, and of constitutional disturbance. When small, a mass of the kind might be mistaken for scirrhus; but it commonly occurs in early youth, at which period scirrhus is extremely rare; and, in addition to the points already mentioned, it is moveable. When it has attained large dimensions, the possibility arises

(especially from its unequal consistence at different parts) of its being mistaken for encephaloid. But, even when thus enlarged, the cysto-sarcoma retains the characters already stated. This form of growth is perfectly curable by operation, even after ulceration has occurred.

The association of encephaloid disease and cysts in a composite tumor, whichever be the primary affection, constitutes a growth the precise nature of which it is often far from easy to diagnosticate with surety at an early period of its development. However, the characters of the encephaloid parts of the mass usually soon manifest themselves, both locally and by their influence on the general health.

When a cyst is formed on a basis of scirrhus, an uncommon combination in this organ, great difficulty of diagnosis arises, and is only to be overcome by a careful estimate of the whole progress of the case.

(*k.*) *Fibrous tumors* (chronic mammary tumor).—The first ground of distinction between fibrous and scirrhous tumors arises out of their relative frequency. True fibrous growths are of excessive rarity in the breast,—almost the sole fact which can be considered to have been established by the recent discussion at the Academy of Medicine of Paris.* These growths are commonly of small size, smooth or tuberculated, hard, roll under the skin, which retains its natural characters, are free from spontaneous pain, and exhibit no tenderness under pressure: they are generally single, and limited to one breast; but may occur to the number of two or three in both, and originate either in the substance of the gland, or in the cellular membrane external to it. These characters do not very prominently differ from those of scirrhous tumor, at a certain period of its development; but the fibrous tumor leaves the skin, nipple, and lymphatic glands unaffected; no adhesions set up around it; it does not become the seat of pain, and exercises no ill influence on the general health.

These growths are said to acquire, in excessively rare instances, considerable dimensions. They then cease to be assimilable to scirrhous, but may acquire some similarity to encephaloid, tumors. Still the condition of the skin, glands, and general health will render error unlikely.

It is perfectly conceivable that in an early stage of progress a satisfactory diagnosis may not be arrived at in *all* cases; fortu-

* See Bulletin de l'Acad. Roy. de Méd. de Paris, tom. ix. 1843-44.

nately, the modes of treating a growth, whether scirrhous or fibrous, would be the same. In either case extirpation is out of the question: in the former, for the reasons already fully explained; in the latter, because the tumor is perfectly innocuous in its intimate nature, and, under any circumstances, only capable of becoming seriously inconvenient from its weight.

(*l.*) *Cartilaginiform* and *ossiform* productions, distinguished *in primis* by their singular rarity, possess the characters of fibrous tumors in regard of influence on the adjacent structures, and the general health of the individual. In a striking case of ossiform tumor, related by Astley Cooper,* the patient suffered from a sensation of burning heat in the part. In this instance, as in the majority of cases of the kind, the calcareous or ossiform deposit seems to have occurred in a fibrous or fibro-cartilaginiform growth. Lamellar ossification cannot be confounded with cancerous tumors.†

(*m.*) *Erectile tumors*, scarcely ever seen in this organ, could only be confounded with encephaloid growths. The spongy feel of the mass and the peculiar condition of the skin will be of importance in the diagnosis. Such tumors are commonly, at least in rudiment, congenital, but occasionally acquired.‡

(*n.*) *Acephalocysts* have been known to form in the breast, and the cyst containing these parasites may enlarge considerably, and lead to ulceration of the surface.§ The hardness of some parts of the resulting tumors, combined with the softness and obscure fluctuation of others, may assimilate the mass in some respects to an encephaloid growth, especially as the breast is the seat of severe pain. But the nipple, skin, and glands undergo no change; and no evidence of constitutional disturbance is perceptible. Whether "*hydatid fremitus*" can be produced in this situation does not appear.

(*o.*) *Hypertrophy* of the *glandular* structure, or *cellulo-adipose* substance of the breast, ends in the production of an enormous mass, marked on the surface with distended veins; such a tumor might by possibility be confounded with encephaloid. But the skin exhibits none of the characteristic appearances of the latter disease, the communicating glands remain unchanged; both breasts are sometimes affected (as in Houston's well-known case); the nipple

* Diseases of the Breast.

† Morgagni, de Sed. et Caus. Morb., Ep. li. art. xli.

‡ Andral (Anat. Pathologique, tom. ii. p. 727; 1829) relates a curious case of the latter kind observed in a male.

§ A. Bérard, Journal Hebdomadaire, tom. vii.

becomes broader and flatter, but undergoes no depression; the mass implicates equally all parts of the breast, and does not exhibit obvious or prominent inequalities on the surface. The health may eventually suffer in consequence of the drain upon the system maintained for the nourishment of the mass; but this occurs at a much later period than it would in the case of any form of cancerous affection.

(*p.*) Though the mistake is necessarily a rare one, *syphilitic* has sometimes passed in this region for cancerous ulceration. The history of the case and the effects of anti-venereal treatment will remove the difficulty.

§ XVII. The general principles laid down respecting the treatment of cancer are strictly applicable to the disease, as it occurs in the breast. It is in cases of cancer of this organ that (when the patient presents herself at an early period) the internal use of arsenic, inunction with ioduretted lead-ointment, and compression with the slack air-cushion apparatus, may be had recourse to, with the fairest prospect of success. It is here that by persevering use of these means the issue, if not of actually curing the disease completely, at least of arresting its local advancement, and throwing into permanent abeyance the constitutional dyscrasia that led the way to its development, may be most frequently accomplished. In what proportion of cases such treatment fails, future numerical investigations must decide. But were total failure in respect of cure, or suspension even, materially more frequent than there is fair reason to believe it would prove, no motive either for regret that the effort had been made, or for determination *in futuro* to attack the local disease with the knife, when *first* evolved, would be afforded. It has been seen (p. 239) that the advantages secured by *early* operation are, perhaps, rather matter of imagination than of demonstrable reality; and that unprejudiced examination of available evidence leads to the inference that treatment in the early periods, *plus* operation (if necessary) in the later, gives greater chance of suspension of the disease and of prolongation of life, than early operation *minus* treatment.

It may appear difficult to understand, or to admit, that removal of a tumor by the process of compression should avert the chances of *local* reproduction more effectually than extirpation with the knife. If such removal do actually prevent reproduction the more surely of the two means, it is of little consequence to practitioner or patient, *why* it does so. But, as the treatment by compression has not yet been in use for a sufficiently long period to supply an

experimental conclusion on the subject, it may not meanwhile be devoid of utility to suggest some reasons, why the disease should be less likely to return after the action of the slack-air cushion than of the knife. Suppose, first, that some of the cancer-cells are left behind by the knife; that reproduction will follow, appears certain as a matter of experience, and is intelligible as a matter of reason, because the unremoved cells are unaltered in properties: but cancer-cells acted on by pressure, even though not removed, are presumably deprived by the molecular action, which precedes removal, of the vegetative faculty. Or, secondly, suppose that the operation of the knife or of pressure has completely removed all cancer-germs from the spot: it is clear that excision, so far from having favourably altered the tendencies of the adjacent tissues, actually, as a matter of experience, seems often to have invigorated the formative power of the part; whereas it is perfectly conceivable that pressure shall, by altering the properties of those tissues, have deprived them of their special tendency to attract (p. 78) cancer-blastema.

The general and hygienic management of these patients, if they have not passed the age of menstruation, must be conducted with special reference to the catamenial function.

Among the local symptoms, the œdema described above, perhaps, requires particular mention. This serous infiltration may be warded off for some time by keeping the arm constantly on an inclined plane. I have seen blisters afford temporary relief; and puncturing the skin will of course, for a time at least, diminish the painful tension of the parts. I have not myself known the punctures become troublesome sores, but such a result has been witnessed by others. When œdema is associated with thickening of the skin and occasional attacks of erysipelas, little of an effective kind can be done for its relief. Leeches, blisters, and scarification were productive of some amelioration in a case referred to by M. Cruveilhier.

Upon the bearing of the existence of lymphatic enlargement on the propriety of using the knife, it is unnecessary to dwell in the present place. The existence of retraction of the nipple, or even, in my mind, of the dimpling of the skin described above, renders operation inadmissible. The least disease of the lungs is an absolute contra-indication; a careful physical investigation of those organs should consequently always be made, when it is proposed to submit a patient to operation. It is commonly believed that the ramose variety is less favourable than the tuberous for operation.

When encephaloid grows from the walls of a simple or multilocular cyst containing serous fluid, the operation of puncturing the

cyst and drawing off its contents accelerates the growth of the superadded cancer. The removal of pressure, as elsewhere explained, sufficiently accounts for the effect of such operation, the performance of which is altogether unadvisable. Dupuytren in cases of this kind enucleated the cancerous masses, and stuffed the cyst with shredded lint to promote cohesion of its walls.

MALE BREAST.

§ I. Cancer of the male breast is commonly of the scirrhous species; colloid has certainly not been observed in this situation, and of encephaloid the examples are very few.

§ II. The precise mode of connexion of the scirrhous substance with the structure of the rudimentary gland has not been investigated. I have before me two specimens (University College Museum) of the disease in a well-marked form; in both of these the similitude of the disease to the ordinary scirrhus of the female breast is very striking. The disease commonly originates in the nipple, or its immediate vicinity.

§ III. The affection is one of comparatively advanced years. In one instance the disease was observed in a man aged thirty; in all the other cases, I have had cognizance of, the age varied between fifty and seventy years.

§ IV. The symptoms and local course of schirrus of the male breast are identical with those observed in the female. An impression appears to exist that the disease is in the former sex less commonly attended with development of visceral cancer; but this appears to me a point requiring further investigation. M. Velpeau,* who adopts the affirmative, found nevertheless a cancerous growth in the axilla in one of five cases of the male breast. Mr. Travers relates the case of a waggoner aged fifty-eight, in whom the new growth, first perceived as a lump the size of a marble in the left breast, acquired in the course of three years the dimensions of a pullet's egg, became adherent to the skin all round the nipple, and of a livid hue, partly due to large varicose veins running over the surface. The axillary and supra-clavicular glands were enlarged and indurated; small tumors formed in the surrounding skin; and after the man's death (which ensued forty months after the tumor was first discovered) both lungs were found thickly studded with nodules of encephaloid.† In the body of an old man who died of

* Dict. de Méd., loc. cit., p. 103.

† Med. Chir. Trans., vol. xvii. p. 320. 1832.

scirrhus of the right mamma, extending to the axilla and encroaching on the muscles and bones, M. Cruveilhier* found multitudes of subcutaneous and muscular cancerous nodules in various parts of the frame, and similar productions in the omentum, the liver, the lungs, and the heart.

§ V. There seems evidence sufficient to show the possibility, nevertheless, that excision may be undertaken with better chance of ultimate success in the male than in the female. M. Velpeau states that no return had occurred in four cases operated on by himself; he, however, leaves us uninformed as to the length of time which had elapsed between the performance of his operations and the publication of their result. Dr. Warren† refers to a case permanently successful, as the patient was seen twelve years after the morbid mass had been excised.

* Essai sur l'Anat. Pathologique, tom. i. p. 86. 1816.

† Op. citat., p. 282.

CHAPTER VIII.

CANCER OF THE ORGANS OF INNERVATION AND APPENDAGES.

SECTION I.

ENCEPHALON.

While every part of the encephalon has been the observed seat of cancer, the frequency with which its chief divisions suffer, is very different. The cerebrum holds the first place in this respect: Andral found that, in forty cases of encephalic cancer, the cerebral hemispheres were affected thirty-one times, the cerebellum five times, the pons Varolii once, and the pituitary gland thrice: the mere difference of size may perhaps to some extent explain this difference.

The anatomical characters of the disease are essentially the same in these different parts, and the symptoms to which it gives rise in all of them very closely similar.

CEREBRUM.

§ I. Twenty-two of 8289 deaths from cancer are ascribed in the Paris Registers to the brain. In five of the sixty-seven cancerous subjects dissected by Herrick and Popp, the brain was carcinomatous.

Much confusion arises in the accounts given of cancer of the brain in consequence of authors including under the same head tumors originating not only in the various divisions of the medullary mass, but also in the membranes. The following description is founded on (and therefore applies only to) cases where the substance of the cerebral hemispheres was the seat of the morbid production. It must no doubt be admitted, that, in the existing state of knowledge, it is not possible, during life, to distinguish with any degree of certainty the precise seat, cerebral or meningeal, from which a cancerous tumor springs; but assuredly it is not by adhering to a vicious mode of anatomical arrangement that future correct clinical inferences are to be hoped for.

§ II. The three species of cancer occur in the brain: encephaloid by far the most frequently. True scirrhus is excessively rare,

although the term is very frequently to be found in descriptions by the older writers. Chronic induration of the simple kind, following a state of previous softening, has evidently been spoken of under that title. Andral found the left optic thalamus and surrounding substance converted into "lardaceous" tissue, exhibiting all the characters of cancerous matter, in a male aged forty-five; the kidneys and several bones were also cancerous.

Andral relates two cases in which the characters of colloid cancer appear to have existed. In one of these the affected part was extremely resistant under incision, and "transformed into lardaceous tissue, displaying all the characters of scirrhus; in several spots this tissue was excavated into small cavities containing a tremulous matter, of greyish-white colour and resembling glue." In the other case, "areolar-like, bluish-white, semi-transparent, and very hard tissue, hollowed out here and there into small cavities filled with a fluid resembling apple-jelly in aspect," existed in connexion with firm and softened encephaloid. Andral ascribes the appearance of cavities with jelly-like contents to softening of scirrhus: the facts and considerations which, as it seems to me, throw doubt upon this mode of viewing the states in question, are elsewhere (p. 72) stated. M. Gaudet* describes another and tolerably satisfactory case of similar kind.

There are few varieties of appearance observed in other organs which are not exhibited in cancer of the brain. The hæmatoid aspect is, however, at the least, very rare. All degrees of consistence present themselves; and a large cavity (if a description given by Rayer† may be literally received), measuring two inches by an inch and a quarter, has been formed by the breaking down of encephaloid substance in the midst of a hemisphere. It is to be observed, that in no organ are tumors more frequently deficient in those well-marked characters, which to the practised eye at once assign them their place in the series of morbid formations.

§ III. Cancerous productions occur in the brain in both the tuberiform and infiltrated forms. The size of tumors and extent of infiltrations is subject to much variety; nodules not larger than a pea are met with, as well as masses filling the place of an entire hemisphere almost: tumors of medium size are, however, most common. In the majority of cases the brain is the seat of but one cancerous growth; several are, on the other hand, discovered in certain instances.

* Bouillaud, de l'Encéphalite, p. 216. 1825.

† Maladies des Reins, tom. iii. p. 697. 1841.

Cancerous tumors appear in some cases actually continuous with the surrounding brain; in others they are said to be separated from this by cellular membrane assuming the character of a cyst; in a third class of cases, without being cut off from adjoining parts by a pseudo-cyst, they yet seem deficient in intimate connexion with the natural tissue around. The last-mentioned is the most common condition.

§ IV. The left and right hemispheres seem to suffer from the disease with very nearly equal frequency; both hemispheres are seldom implicated, and scarcely, as far as I have ascertained, except when the cerebral affection is secondary. In eighteen cases I find the disease to have been seated in the left hemisphere in nine; in the right hemisphere in eight; in both hemispheres in two.

In nineteen cases the lobes affected were: the posterior in four; the middle in nine; the anterior in four; the anterior and middle in one; all three lobes in one.

In one of these nineteen cases the optic thalamus, in two the corpus striatum, and in one both these parts were the seats of the cancer. I have met with one example only of implication of the convolutions as an apparently primary state, and none of limitation of the disease, when primary, to those parts; they appear to suffer but rarely by extension of cancerous infiltration from adjacent textures.

§ V. Cancer of the brain occurs associated or unassociated with similar disease elsewhere; recorded cases, as I have found them, furnish nearly an equal number of examples of both states. Andral gives a proportion of about four to one of the latter to the former; but this is unquestionably an incorrect estimate, and no doubt to be explained by that pathologist having only submitted cases specially reported as examples of cancer of the brain to analysis. It is obvious that in the decision of such a point the cases employed should be taken indiscriminately. The cerebral disease is of course the primary evidence of the cancerous diathesis, when the sole one; in the other class of cases it is sometimes secondary, sometimes primary: Andral infers, from the cases he has collected, that it is always secondary when associated, but I have found it obviously primary in some few instances. Under either of the latter circumstances, organs the most various are affected; and I have not been able to discover any convincing proof of the accuracy of an opinion which I find stated in more than one place, that the brain is particularly prone to suffer when a cancerous testicle has been removed: examples of the connexion no doubt exist, but not in any remarkable number.

§ VI. The state of the non-cancerous part of the brain varies. In some cases it exhibits the characters of perfect health. The most simple alteration witnessed is flattening of the convolutions corresponding to the diseased mass (a state less readily explicable in these cases than in hæmorrhage or chronic softening), or detrusion inwards of the wall of the lateral ventricle; injection of the punctiform variety, and more or less bright and extensive, is not uncommon. Authors affirm that a stratum of variable thickness immediately surrounding the cancer is habitually in a state of red or colourless (chronic) softening: such is, however, far from being the uniform, or indeed, judging from existing records, the more usual fact: in some still rarer instances induration of tissue is apparent.

The membranes are often in the natural state. The pia mater may be intensely injected; the dura mater has in a very few instances been also cancerous.

We should expect (reasoning upon the amount of obstruction of the venous circulation necessarily caused by the new mass, especially when occupying certain localities) to find serous infiltration of the sub-arachnoid cellular membrane and accumulation in the ventricles to be morbid changes of very constant occurrence. Far from this, however, I have not found any case in which either form of serous effusion appears to have existed to any considerable amount, and, on the other hand, many instances in which both were totally absent.

Cancer of the brain tends in some cases to attack the meninges, and even the bones; or make its way through the natural orifices of the cranium. Upon the phenomena then observed information will be found in the next section.

Andral states, that, when the cancer is situated in such manner as to touch the nerves, it generally affects them, either by rendering them cancerous, or by compressing or destroying them. It is certain, however, that none of these modes of influence have been often *observed* in the instance of actual cerebral cancer; nor have they, as far as I can discover, presented themselves in many cases even of meningeal carcinoma. I shall nevertheless have occasion, under the latter head, to allude to some examples of both.

§ VII. Not a few cases are on record in which every organ in the body, except the brain, was perfectly healthy. Setting aside the development of cancer, I cannot point out any morbid change, occurring in other parts of the body, which either on account of its frequency, or its apparent relationship to the cerebral disease, may be fairly considered a dependance on this: morbid changes the

most serious and the most insignificant are met with. Perhaps an exception may be claimed for œdema of the lungs; but this condition is probably a mere phenomenon of the death-struggle.

§ VIII. The brain is one of those organs in which the influence of predisposition must be admitted to be strongest in the generation of the disease, as it is excessively rare to discover any immediate and direct cause for its development. Of thirty-one cases collected by Andral, there were but two, at the most, in which the disease followed external injury.

M. Bouillaud affirms that the cases he has collected show that the disease originates amid the symptoms characteristic of acute or chronic inflammation. I have examined these cases without discovering any evidence of the alleged fact; and M. Andral states, that in not one of the cases analysed by himself did the malady follow in the train of an acute affection of the brain or meninges. M. Calmeil found very few individuals (cut off by cancer of the brain), who had traces of old wounds or other injuries on the head. Several, on the other hand, exhibited venereal exostoses, or caries of the nose, forehead, occipital or temporal bones: mere coincidences in all probability.

The ages, at death, of fifty-six persons affected with cerebra cancer, I find to have been as follow:

Age.	Cases.	Age.	Cases.
0 to 10	5	40 to 50	13
10 „ 20	5	50 „ 60	13
20 „ 30	2	60 „ 70	6
30 „ 40	9	70 „ 80	3

§ IX. (*a.*) There are a certain number of cases on record (*e. g.* Andral's case 5), in which no symptom of any kind has drawn the attention of the physician to the head of individuals, in whose brain one or more cancerous growths have been discovered after death. These cases of *latent* cerebral cancer prove that it is much less the new formation itself, than the accidental modifications it produces in the surrounding nervous substance, to which the symptoms, commonly connected with its existence, are to be referred.

(*b.*) The only local symptom observed in cancer of the brain is pain: its frequency is signified by M. Calmeil having found it in thirty-three of forty cases. This *cephalalgia* varies in all its characters in different cases. In some instances constituting the main phenomenon of the disease, in others it is so slight, as scarcely to attract the patient's attention; while in a third class of cases it is wholly absent. Its total absence, however, is extremely rare. It

may be constant, and of uniform intensity, almost from its first development; or it may be remittent, or irregularly intermittent. The periods of intermission vary extremely in length, for instance, from some hours to a few days, or even months; and the violence and duration of successive paroxysms are subject to similar irregularity in duration and severity. I was witness to a case, some years past, in which the cephalalgia wore the lancinating character; but there are but few similar cases on record. Generally speaking, there is nothing special in the nature of the pain. Paroxysms of acute suffering sometimes terminate by a distressing sensation of cold in the seat of pain. In one of Andral's cases, the character was at first that of rheumatismal hemicrania, accompanied when severest with copious vomiting, and two years later with formication in the hand and foot of the opposite side.

In respect of seat, the pain either occupies primarily the site of the tumor, or it does not. In the former case (which is, unfortunately for the purposes of diagnosis, the more rare) the cephalalgia is limited accurately to a single spot or to one side of the head, or shoots from a fixed and invariable point in certain directions over the scalp, face, and upper part of the neck. Sometimes sharp pangs shoot from the front to the back, or from side to side of the head.

In another class of cases the entire head is the seat of pain, and no particular point is more acutely painful than the rest.

Lastly, the cephalalgia produced by cancer may, although the essential morbid state remains unchanged, be temporarily benefited by various palliative measures: for example, by pressure, by general or local bleeding, blistering, counter-irritation with tartarized antimony; or the application of sedatives to the unabraded skin, such as solution of the cyanide of potassium, which was successfully employed in the case alluded to as having been observed by myself. Andral mentions, that in certain cases the pain has increased previously to each menstrual period, remitting in violence with the establishment of the flow. I find cases related, in which the heat of bed increased the severity of the pain; others in which warmth mitigated the patient's suffering.

The colour of the skin is unaltered, and its temperature natural.

The functions of sensibility, movement, and intelligence are commonly modified; but not in a uniform or characteristic manner.

The *sensibility* of the limbs and trunk may be diminished, increased beyond the natural standard, or perverted. In some cases (one of every ten, according to M. Calmeil) the skin of one or both

sides has been found almost, or even completely, destitute of sensibility. In other instances, on the contrary, the surface acquires extreme sensitiveness to even the gentlest impressions: this, however, is very rare; occurring, according to M. Calmeil, in one only of forty cases. Or, as in some of the cases collected by Andral, torturing pruritus is complained of. Formication sometimes precedes paralysis, existing, it may be, for months (Andral, case 2) before the full establishment of the latter. In a third class of patients, pain, shooting through the limbs, constitutes a very prominent symptom.

The presence of a tumor within the brain must, we should expect, be necessarily productive of some form of *paralysis*. The fact is, however, otherwise. Thus M. Calmeil says (and his estimate is the highest given) that five-eighths of individuals labouring under organic affections of the encephalon present paralytic symptoms: three-eighths are consequently free from such symptoms. Durand-Fardel found paralysis mentioned in only twenty-two of seventy-one cases analysed by himself. This disparity doubtless depends upon a great share of M. Calmeil's patients having been lunatics, who frequently die with general paralysis.

The paralysis may be *hemiplegic:* M. Calmeil found it so in four of the five-eighths of the individuals, having organic disease of the brain, referred to. Or, as is much more curious, *paraplegia* may be the form observed. Andral quotes from Esquirol a case, in which the anterior extremity of each hemisphere contained a cancerous mass, while the lower limbs only were paralysed. Durand-Fardel refers to four such cases. Hemiplegia again may be followed by paraplegia, and this by general paralysis.

The paralysis may be established gradually or suddenly, the former being by far the more common fact. Durand-Fardel states that seventy-one cases, collected from various sources, did not furnish a single example of the latter mode of establishment; Calmeil correctly affirms that it occasionally occurs, and the fact is certain in respect of meningeal tumors. I do not merely refer here to cases in which an apoplectiform attack occurs suddenly, attended with paralysis; and in which the motile power reappears with returning consciousness. The paralysis is at first commonly imperfect, and not very unfrequently disappears temporarily, (and this on several successive occasions,) to become eventually a permanent and perfect state.

The paralysis may be simple, or attended with tonic, clonic, or persistent contraction.

Paralysis of the tongue was noted by M. Calmeil in upwards of one-third of the individuals observed.

Partial or *general convulsive movements* are not uncommon (Calmeil says they occur in upwards of half the cases); and fits having the epileptic character have, in a considerable number of instances, depended on a cancerous tumor in the brain. In some patients local convulsions have assumed the tetanic form. Generally speaking, convulsions do not occur unless in parts already paralysed; but it is important to observe, that they do exist independently of that state, and have sometimes ceased permanently on its perfect establishment.

The *intellect* may, or may not, remain unaffected. Andral and Durand-Fardel infer, from the cases analysed by them, that it undergoes no obvious change in the greater number of instances. M. Calmeil, on the other hand, found the intellectual faculties impaired in half his cases of organic diseases of the encephalon; M. Durand-Fardel questions, whether this high ratio may not depend upon M. Calmeil having chiefly observed in lunatic establishments.

In some cases the intellect suffers at an early period, in others not till towards the close of life. In certain instances intervals of lucidity occur, the patient presenting only, as Andral observes, from time to time an obtuseness of comprehension, loss of memory or actual delirium.

Dementia has occasionally, but rarely, been observed.

In certain cases, but these are rare, the *faculty of speech* has been especially affected; in others, all power of *memory* been completely lost.

The *functions of the encephalic nerves* are sometimes disordered, and this under two varieties of anatomical state. Those nerves may be cancerously diseased by extension of the morbid growth to their substance, or they may be dragged, compressed, and rendered atrophous by its enlargement; under these circumstances functional disturbance is to be expected. Or, on the other hand, the disease may not implicate the nerves, and yet their functions shall be deranged: a girl aged seventeen, referred to by Andral, successively lost the use of all her senses, and, at the same time, all motile power, the intellect remaining unimpaired; here the nerves were not included in the disease.

All observers agree in noting the frequency with which the *sight* of these patients suffers; M. Calmeil calculates that vision is considerably weakened, or altogether lost, in three of every eight cases. Diplopia has not unfrequently been observed; some patients fancy

objects turn round them; others, M. Calmeil observes, experience actual hallucinations of vision. One out of nine persons, M. Calmeil found, had become *deaf;* the senses of *smell* and *taste* do not appear to suffer, except in extremely rare instances, (as for instance in Mr. F. Hunter's case,) independently of implication of their special nerves. These various affections of the organs of sense do not always persist, or increase progressively, when once established: cases are related in which alternate loss and recovery of sight and hearing occurred.

The mode of combination of the cerebral phenomena varies in different cases; and upon these variations Dr. Abercrombie founds a division of organic diseases of the encephalon into eight sections. Two of these sections supply no distinct example of cancerous growth, occupying the cerebral hemispheres; in those which do supply such cases, the predominant symptoms were as follow. (1.) Long-continued headache, terminating at last by coma or by gradual exhaustion; (2.) Headache, affections of the senses, speech, or intellect; (3.) Headache, affections of the senses, and convulsions; (4.) Symptoms in the head with paralysis; (5.) Symptoms in the head with paraplegia; (6.) Vertigo and apoplectic symptoms; slight and transient apoplectic attacks.

For a considerable time after cerebral symptoms have drawn attention to the head, the nutritive functions (provided those symptoms be neither continuous, nor excessively severe) may remain unimpaired. Eventually, however, digestion and assimilation suffer, and emaciation follows; the skin very rarely assumes the yellowish tint of cancer. Some patients suffer from uncontrollable vomiting; and in the case of a female, aged seventeen, observed by Mr. John Hunter, constipation of fourteen days' duration was once noticed.

The attempt has been made to attach particular symptoms to affection of particular parts of the cerebrum. M. Bouillaud is of opinion that disturbance, or loss, of the faculty of speech or of memory (a sort of idiotcy) announces the anterior part of the organ to be affected; while paralysis of the limbs shows that the cancerous growth is either seated in, or presses upon, the middle or posterior lobes, or the corpora striata and optic thalami. Cases supporting, so far as this goes, the system of localisation, may no doubt be quoted; but as certainly are there others totally at variance with its provisions, even in respect of the connexion of the anterior lobes with the faculty of speech.

§ X. It is impossible to calculate the real duration of the disease

itself; the time elapsing between the appearance of the earliest symptoms of its existence and death varies from a few months to several years: individuals have suffered from agonizing cephalalgia for upwards of twelve years, before falling victims to the disease. The affection rarely proves fatal in less than a year.

§ XI. Unless when the cerebral cancer is associated with similar disease in other parts, the individual is not cut off by the progress of the special cachexia. When the affection of the brain is primary, the mode of death varies; but the fatal event most commonly occurs by coma, preceded or not (the former the more usually) by convulsions. Acute encephalitis proves the immediate cause of death in a few individuals; a small fraction of patients are cut off by inflammation of distant organs (especially the lungs and pleura), or by colliquative diarrhœa. Death is not very unfrequently hastened by ulceration of the integuments of the sacral region.

§ XII. The diagnosis of cerebral cancer is in its infancy: this is sufficiently obvious from the excessive rarity of cases in which the existence of the disease has been announced with any degree of confidence during life.

The circumstances most distinctly permitting the physician to affirm that a *tumor* exists within the cranium are, the existence for a considerable period of intense cephalalgia, especially if limited to a fixed point, or even to one side of the head, and if attended with repeated vomiting; of convulsive movements without paralysis, but followed by mere weakness or actual paralysis of the affected parts; of different affections of the organs of sense, especially alteration of sight; and of disturbance of intellect, while the general health does not very materially suffer. But the previous details show, that such a combination of circumstances will not very commonly exhibit itself.

Colourless softening of the brain is the affection bearing greatest similitude, in respect of symptoms, to cerebral cancer; and such must of necessity be the fact, in as much as the latter affection frequently gives rise to softening of the nervous tissue surrounding the adventitious mass M. Durand-Fardel has made this point of diagnosis the subject of special study, and the substance of his results may be stated as follows. In cases of colourless softening cephalalgia is less frequent than in cancer, and never constitutes its sole symptom; it is rarely limited to one side of the head, is sometimes general, almost always frontal, and is not habitually severe; complete amaurosis never occurs, as far as M. Fardel's experience goes, under the influence of softening; and convulsions in non-

paralysed parts are infinitely rare in this disease; these circumstances will generally suffice to distinguish the malady in question from tumor. But when gradual hemiplegia has occurred, it will be impossible (unless this have been for a long time preceded by headache or convulsive movements) to diagnosticate the true nature of the affection.

The existence of tumor being considered established, the next point is to determine its *nature*. Fibrinous, simple albuminous, fibrous, fibro-calcareous, cholesteatomatous and tuberculous masses, besides certain entozoa, form within the cranium, as well as cancerous productions: how are they to be distinguished? Experience has as yet furnished no decisive reply. With regard to the distinction of tuberculous and cancerous tumors, I can only observe, that, as M. Louis has proved that, with the rarest exceptions, the presence of tuberculous matter in any organ involves, in subjects aged upwards of fifteen, its existence in the lungs, careful examination of the physical condition of those organs may lead to a determination of the nature of the cranial formation. If they are healthy, the latter cannot be tuberculous; if they are tuberculous, the chances are not only directly in favour of the intracranial tumor being composed of the same material, but against its being cancerous; for I have shown that the coexistence of carcinoma and tubercle in the same organism is extremely rare. If the patient be of advanced age, again, the chances are strongly in favour of the growth being carcinomatous: if an external cancer exist, this becomes next to matter of certainty.

What part of the hemisphere the new growth may occupy, or even whether it be seated in the brain itself or the meninges, are problems insoluble in the majority of cases, in the existing state of knowledge.

§ XIII. It is obvious that the treatment of this affection can be palliative alone; but much may be done towards prolonging life and mitigating suffering. The symptoms, we have seen, really depend upon irritation of the brain;—to ward off, as far as possible, such irritation must consequently be the physician's care. This will be best done by enjoining a light nutritious, and, above all, a moderate diet, total abstinence from stimulants, and great caution in sexual intercourse; the patient should take daily walking exercise without fatiguing himself, avoid intellectual exertion, and endeavour to keep aloof from all sources of mental anxiety and disquietude. Great attention should be paid to the state of the bowels; and, should symptoms of abdominal plethora exhibit themselves, an

occasional application of a few leeches to the anus, or hot pediluvia or sinapisms to the legs, may be had recourse to with advantage. The skin should be stimulated to free action by the moderate use of the tepid bath, and friction with the horse-hair glove. In a word, all measures should be adopted which experience has shown to promote the attainment of a moderate amount of vital energy and general health, without incurring the risk of producing an over-active state of the circulation.

Incidental mention has been made of means which relieve the torturing headache of these patients. The administration of quinine has, M. Calmeil observes, frequently suspended or mitigated for months at a time the severest paroxysms, when these appeared to have an intermittent character.

Sudden cerebral attacks, indicated by convulsions, loss of consciousness or of one or more senses, are distinctly relieved by blood-letting, varying in amount with the exigence of the case, and the general condition of the patient's health.

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CEREBELLUM.

§ I. Cancerous tumors are of rarer occurrence in the cerebellum, than in the cerebral hemispheres ; the anatomical characters of the growths, and the local effects they produce, are the same in both situations.

§ II. *Local pain*, noted in the majority of cases, has been referred by patients to the occiput and nucha : in some instances other parts of the head were affected, and the cephalalgia has even been general in certain cases. The pain, in some persons trifling, in others rather severe, has, in some instances, been agonizing. Dr. Latham (Med. and Phys. Journal, July 1826,) has recorded a very remarkable case in which a mass " like fœtal brain" grew from the substance of both lobes of the cerebellum, and descended within the dura mater

into the spinal canal as far as the sixth cervical nerve: here the pain exhibited most singular remissions some time before death, but eventually became continuous. Andral states that no difference can be detected in the nature, extent, or seat of the morbid changes discoverable in the two classes of cases—those in which pain exists, and those in which it is absent; peculiarity of individual constitution must consequently be referred to for an explanation of the symptomatic difference observed.

The *intellect* is rarely affected. The case of a patient observed by M. Roussel shows, however, that peculiar intellectual impairment may be produced by tumor of the cerebellum: here an encephaloid mass had formed in the centre of the right lobe of that division of the encephalon, and the individual lost, at first from time to time only, but afterwards permanently, the power of recollecting words. General feebleness of intellect was observed by M. Velpeau in an instance where an encephaloid growth encroached upon the postero-inferior part of the cerebellum, as well as the medulla oblongata.

The doctrines taught by certain physiologists concerning the influence exercised by the cerebellum in regulating movements, give to the study of alteration of that function peculiar interest. Now it appears that among thirty cases of morbid product developed in the cerebellum, M. Andral found eight in which no affection of the function in question had been observed. In some of these eight cases the disease was cancerous; and either one or both lateral lobes of the cerebellum was affected. The most remarkable instance is furnished by Velpeau's case just referred to; here, notwithstanding the implication of the medulla oblongata, the patient's motile powers had undergone no special change.

Defective co-ordination of muscular action (producing in some cases a "tremulous and unsteady walk, like that of a person balancing a burden on the head,"—Latham's case) has been observed in very few instances: yet this is the mode of morbid condition of motility, which the doctrines above alluded to would teach us uniformly to expect.

Hemiplegia is also excessively rare; *paraplegia* still more so; paralysis of the four limbs has been witnessed. In these cases the alteration of movement existed on the side opposite the affected lobe of the cerebellum; or, if both lateral lobes were implicated, the paralysis was most strongly marked on the side opposite that of the more extensive and advanced disease. A few patients have been observed to suffer simply from gradually increasing feebleness.

Convulsions are of more common occurrence than paralysis. Andral finds the following varieties (which cannot be ascribed to variety of seat of the morbid growth) noted by different observers: general convulsions of the entire body, recurring at shorter and shorter intervals (and sometimes eventually proving fatal);—convulsions attended, or not, with loss of consciousness,—in the former case having the epileptic character;—convulsions limited to one arm. In some individuals the muscles of the head, the neck, or the eye, were in a state of permanent contraction.

Morbid sensibility of the skin, although sometimes observed in cases of cancer of the cerebellum, appears rather to have depended, as shown by Andral, upon some accompanying morbid change than upon the cancerous disease of that part. Bayle observed a case of encephaloid growth in the centre of the right lobe of the cerebellum; the right arm became the seat of cramp and formication at a certain period of the disease: but Andral is probably correct in referring these symptoms rather to some temporary modification occurring in the left lobe of the cerebellum than to the tumor in the right,—in as much as the symptoms existed on the same side of the body as the latter.

Diminution or total abolition of sensibility (when really referrible to the condition of the cerebellum itself) does not appear to have been noticed, except towards the close of life.

The only one of the *senses* which appears from recorded cases to have been impaired, independently of implication of its special nerve, is that of *vision*. Complete or incomplete amaurosis has been observed in a sufficient number of cases to render this symptom one of deep interest; but it cannot be connected with affection of any particular part of the cerebellum rather than of others; nor, as may be gathered from the description of cancer affecting other portions of the encephalon, does it, taken alone, by any means localize the disease in the cerebellum.

Treviranus teaches (and the opinion is with many matter of accepted doctrine) that the healthy influence of the cerebellum is necessary for perfect *audition*. Yet the faculty of hearing was not affected in a single recorded case of organic disease of that portion of the encephalon, where the portio mollis was ascertainably unimplicated.

Like diseases of all parts of the encephalon, cancer of the cerebellum is not unfrequently attended with *vomiting* or *nausea*. These symptoms may, indeed, constitute the sole evidence of disordered health; or, as is more usual, there is generally some amount of

headache present: under both these conditions the stomach is found perfectly free from morbid change.

The thirty-six cases of various organic diseases of the cerebellum analysed by Andral, do not supply any example of cancerous affection of that organ, attended with unnatural condition of the genital organs or of the sexual passion. I find a case referred to by Froriep* somewhat illustrative of this point: the cerebellum of a girl, subject to violent erotic paroxysms, was compressed by an encephaloid tumor, which extended outwards through some of the openings at the base of the skull. There is nothing exceptional, however, in this want of evidence in favour of Gall's theory of the influence of the cerebellum on the amative propensity; affections of all kinds of that portion of the encephalon fail, almost as completely as cancer, to lend support to the notion of Gall. Other persons have transferred the seat of the passion to the cervical medulla; but with similar unfortunate results in respect of evidence derivable from pathological anatomy.

§ III. The observations made on the general diagnosis of intracranial tumor (p. 497) are perfectly applicable here. The seat of the cephalalgia may in some cases (especially if the influence derivable from its occupying the occiput be confirmed by the peculiar failure in co-ordination of movements referred to) guide the physician to the site of the tumor; but, on the other hand, the position of the cephalalgia may deceive, and the motile powers may be in a perfectly natural state.

PONS VAROLII.

Dr. Yelloly † describes the case of a man, aged thirty-six, affected with slight paralysis of the right side, diplopia, and luscitas convergens of the left eye, subject for twelve months to occasional severe pain of the head, shooting from behind forwards. Slight stammering and distortion of the mouth followed. The pulse, beating sixty-eight, was rather weaker in the affected than the sound arm: in other respects, the health was natural. The patient died, about a week after he was seen in this state, under general convulsions of twenty-four hours' duration. A tumor, about as large as a hazel-nut, was found sunk into the left side of the pons, in its posterior part, pressing upon the left abductor nerve. The tumor, in a state of imperfect suppuration, is assimilated by the author to scrofulous masses; but the absence of disease

* Med. Zeitung, No. xlv. 1834.

† Med. Chirurg. Transactions, vol. i. p. 183. 1815.

of the lungs makes it excessively improbable that it was tuberculous.

Mr. Salter* has recorded a full account of a case in which a considerable portion of the pons was converted into a substance of a fleshy appearance, harder than muscular fibre, forming on the surface two triangles, with their apices nearly united; the base of one extending some way into the right crus cerebri; that of the other, a little downward upon the commencement of the medulla oblongata. The chief symptoms observed in this case, in April 1813, were: pain changing in position, but particularly severe at the back of the head, nucha, and between the shoulders; occasional vertigo and nausea without vomiting; irides natural; bowels costive; pulse eighty. In February 1814, the palpebræ were more than half closed; vision imperfect, and almost limited to the left eye; imperfect paralysis of left side; vertigo; tinnitus aurium; constipation; diminution of the cephalalgia; fits of stupor occurring twenty times in a day; universal muscular debility, eventually paraplegia; pulse sixty; death by gradual exhaustion in October 1814, the upper limbs having become paralysed about a fortnight before.

It is stated by M. Scipion Pinel,† that, in certain cases of cancer of the pons, singular movements of the eyes, numbness of the limbs, sharp pains in the soles of the feet, in the calves of the legs, and the knees, total loss of sight, taste, and smell, (while the intellect and the faculty of hearing remained sound,) have been observed.

MEDULLA OBLONGATA.

An officer, aged thirty-six, had hemiplegia of the right side, when he came for a second time under the care of M. Broussais,‡ having on a previous occasion been treated by him for "gastro-enteritis." The patient was able to support himself somewhat on the weakened leg; but both movement and sensation had altogether disappeared in the case of the arm. He was pale, somewhat yellowish in the face even; he spoke with difficulty, and the mouth was drawn to the left side. The paralysis had been gradually coming on for three months; the patient's ideas were clear, but he spoke little. Soon after, the left eye lost its transparence and fell into a state of atrophy; while the eyelid of the same side became paralysed. The appetite was tolerable, and there was no fever. One

* Edinb. Med. and Surg. Journ., vol. xi. 1815; ed. 2, same vol. p. 469, 1818.

† Pathologie Cérébrale, p. 484.

‡ Histoire des Phlegmasies Chroniques, 4ème. édit. tom. ii. p. 409. 1826.

morning he was found in a profound state of apoplexy, with stertorous breathing, injection of the face, frequent, hard, and full pulse, burning heat of skin, abolition of all the senses: on the following day he had ceased to exist. The entire duration of the cerebral affection had been about five months. The examination of the body disclosed diffluent pale softening of the left hemisphere of the brain; much turbid serosity in the left ventricle; the left optic nerve diminished in size, and softened: right hemisphere injected; of ordinary consistence; a less quantity of limpid serosity in its ventricle than in the other. Nothing particular in the cerebellum.

"At the upper part of the medulla oblongata, and in the substance of the right corpus pyramidale, was a greyish scirrhous tumor, of greater consistence than the neighbouring parts, and having the encephaloid appearance. It was of the size of an ordinary chesnut, and was continuous with the nervous substance, differing from this only in being of greater consistence."

PITUITARY GLAND.

An officer, who had seen much service, suffered from severe headache; this subsided, and left a feeling of tightness across the forehead. Six or eight months later the right eye, and then the left eye, became blind. Under the operation of an emetic, the sight of the left eye was recovered for an hour; afterwards the total blindness and insensibility of the pupils, together with disorder of the stomach, and frequent nausea, constituted the entire of the symptoms. The patient died comatose in the course of two years. A tumor the size of a hen's egg, containing a thick, purulent, fluid, lay, under the anterior part of the brain, interposed between the optic nerves, which were widely separated from each other. Below, it was attached to the pituitary gland, which was very soft, and enlarged to five or six times its natural size. In this case (related by Dr. Powel*) the new growth seems at least to have had close connexion with the pituitary gland.

M. Andral† refers to three cases of cancer of the pituitary gland, all of them attended with amaurosis: Dr. Powel's case shows that displacement and traction of the optic nerves, without destructive or cancerous infiltration of the structure, will suffice to produce this symptom.

* Medical Transactions, vol. v.

† Clinique Médicale, tom. v. p. 641. See also Rayer, Arch. de Méd., tom. iii. p. 350. 1823.

SECTION II.

CEREBRAL MENINGES AND CRANIUM.

§ I. I PROPOSE describing under the present head those cases of intracranial cancerous disease, which are practically distinguished by the morbid production perforating the cranium, and forming a fungous growth on its external surface; as likewise those where it originates in the meninges, without making its way outwards through the skull. I shall include the consideration of those excessively rare cases, wherein the disease is alleged to have formed in the sub-pericranial cellular membrane, and which are in their clinical relations closely allied to the others.

Perforative cancer of the cranium is an affection very imperfectly understood: a circumstance depending perhaps mainly upon its rarity, but in no small measure upon the pertinacity of certain writers in describing the disease under the insignificant and deceptive title of "fungus of the skull, or dura mater." Nevertheless, the materials exist, scattered through periodicals or contributed in theses, for constructing a tolerably complete history of the disease.

§ II. The affection described by the celebrated surgeon Louis as "fungus of the dura mater" is of cancerous nature; and the cancer anatomically characterising it may originate in any one of the following situations:—1. Dura mater (*a.* external lamina; *b.* internal lamina); 2. Pia mater; 3. Cerebral substance; 4. Cranial bones; 5. Sub-pericranial cellular tissue. Both these propositions will be proved in the sequel. I shall not venture upon an historical sketch of the successive steps by which the present state of knowledge has been reached (some of these will appear clearly as we proceed); but refer those interested in such history to the elaborate volumes of the Wenzels, Ebermaier, and Chelius.

§ III. The very errors of the older observers testify strongly to the *encephaloid* character of fungi of the dura mater: these tumors were in fact by early surgeons (A. Paré, Pauw, &c.), in numerous instances mistaken, from the appearance of their constituent materials, for herniæ of the brain. The fact, however, now rests upon surer foundation: that perforating fungous tumors of the meninges are in the majority of cases composed of this structure is now fully established by the combined testimony of the elder Siebold, Ebermaier, Graff, Schnieber, Otto, Wishart, Abercrombie, Schindler, Chelius, Cruveilhier, Velpeau, &c. The Museum of University College

contains a most satisfactory specimen, and Dr. Carswell's drawings illustrate the fact still further. But true *scirrhous* tumors also spring from the meninges, and destroy the investing bony substance, as appears from M. Velpeau's *Cas remarquable;* here a tumor of this description made its way partly through the occipital bone: M. Cruveilhier's plates exhibit some examples of meningeal cancer belonging to this species, and others have been described by German investigators.—Of ordinary *colloid* carcinoma no example has, so far as I am aware, been met with; but that doubtful variety of the species, termed areolar pultaceous cancer, has been found in the cranial bones.

§ IV. 1. *Dura mater:* (*a.*) *External lamina, or surface.*—Such is still believed by the generality of observers to be the sole seat of fungous growths exhibiting themselves in the form of a tumor on the exterior of the cranium. This opinion, originating with Louis, received the support of the Wenzels,* but was strenuously combated by Walther and others on the evidence of some cases observed by themselves, in which the morbid matter distinctly sprang from other structures. Independently of those referred to or related by Louis and the Wenzels, there are several other examples on record proving that the external surface of the dura mater may be the nidus of these formations. Klein, for example, states that, in a case treated by himself, the tumor was detached without the least difficulty from the perforated bone, from which it appeared to be separated by a particular membrane, and was in vascularized connexion with the external surface of the dura mater alone. Wedemeyer observed a tumor growing from precisely the same seat, in respect of tissue, and protruding through the frontal bone. In the case of M. A. Bérard, the deep surface of the dura mater was perfectly healthy; and the tumor, unconnected with the osseous tissue, extended laterally on each side of the perforation, separating the bone and its lining membrane. Mr. Travers and Dr. Mackenzie relate equally convincing cases. Richerand goes so far as to affirm that it is rare to open the body of a person of advanced age without finding adventitious tumors on the external surface of the dura mater: Boyer, with less inclination to exaggerate, contents himself with commenting on their frequency. In their incipient stage they are stated to form small greyish vegetations, to be remarkable for firmness, and to exhibit a "lardaceous" aspect. I have examined

* The Wenzels however admitted, on the evidence of Sandifort's case and of another observed by themselves, that the disease may be developed in the cranial bones.

such productions, however, and found them purely fibrous, and displaying the curvilinear stromal arrangement of the common uterine fibrous tumor: when possessed of these characters, they are wholly distinct from cancerous growths. The Museum of University College contains a specimen of this kind.

(*b.*) *Internal lamina or surface.*—The precise locality of cancerous growths developed in this situation is in all probability the cellular tissue connecting the dura mater and parietal arachnoid; and they are certainly of more common occurrence here than on the cranial surface of the former membrane. Why they should not so frequently come under the notice of the surgeon as the class just noticed will presently appear. Carcinomatous tumors of the serous surface of the dura mater have been observed by Gondanges, Baillie, Hebréard, Meckel, Otto, Wishart, Ebermaier, Cruveilhier, and Velpeau. Chelius refers to six specimens of the disease contained in the Strasburg museum; and in one of his plates represents cancerous tumors co-originating on both surfaces of the fibrous membrane. Dr. Bright has also figured specimens of the disease in this situation; and shown, with Ebermaier and others, that the so-called glands of Pacchioni may give origin to it. The ordinary tendency of cancers developed in this situation is, as remarked by Otto and Cruveilhier, to grow inwards and depress the brain; under these circumstances they strictly belong to the department of medical pathology. But in comparatively rare instances they manifest an opposite inclination in respect of their growth, press on the skull, determine absorptive destruction of its substance, and protrude externally. In one case described by Cruveilhier, protrusion had actually occurred; in another, perforation was in progress; one of the internal meningeal tumors discovered in the subject of Velpeau's *Cas remarquable* had partially perforated the occipital bone.

2. *Pia mater.*—A specimen of cancerous growth, originating either in the pia mater itself, or in the cellular tissue uniting it to the arachnoid, is figured by Cruveilhier:* although there was no perforation here, there can be no doubt that such effect might arise from the presence of a tumor in this situation, as sometimes happens when they are still more deeply seated. Dr. D. Monro† long since described a tumor, evidently encephaloid, growing "on the brain," and which had perforated the frontal bone: J. Hunter refers to a perforating growth originating, as he believed, from the

* Livr. cit. Pl. 3, Fig. 3.

† Med. Trans. vol. ii. p. 353. Lond. 1772.

pia mater:* Dr. Mackenzie is of opinion (and upon apparently just grounds) that both descriptions refer to the same case.

3. *Brain.*—Georget† relates a case where the greater part of the posterior, almost the entire of the middle, and part of the anterior, lobes of the right hemisphere were occupied by a tumor, which spread to the meninges, and even outside the dura mater to the bones. Ebermaier refers to two cases of cancer of the cerebral substance attended with absorption of the corresponding part of the cranium. In one of these the internal table and diploe of the right parietal had disappeared to a considerable extent, and the outer lamella was attenuated and even perforated. An encephaloid tumor, weighing four ounces, disclosed itself, on post-mortem examination, in the substance of the right hemisphere; the investing arachnoid and pia mater were in the natural state. That protrusion would have occurred here, had the patient lived longer, is rendered next to certain by a case subsequently watched by Ebermaier himself.‡ In this instance a fungous tumor, protruding from the cranium, and opened with caustic during life, was found to have taken its origin from the left hemisphere. Mr. Travers "has a preparation exhibiting a genuine example of encephaloid affecting the anterior lobe of the cerebrum, and protruding the eye from its socket, while the eye itself was perfectly free from disease."§

4. *Bones.*—C. von Siebold, believing, on the authority of two cases he had met with, that the disease always originated in the diploe, (an opinion which seems to have been that of Sandifort, Kaufmann, and Heister,) termed it fungus of the skull. But, though the error of this notion, as an exclusive doctrine, is now thoroughly established, it is equally certain that these growths do frequently spring from the cranial substance. Passing over the cases just referred to, one of the tumors described by Wishart was evidently thus seated; the same may be said of Eck's case; a fungous mass, as large as an infant's head, observed by Schindler, grew from the tissue of the frontal and ethmoid bones. The chief connexions of an encephaloid growth described by Graff were with the diploe and compact substance of the bone; some trifling adhesions only brought it into vascular relation with the dura mater and integuments. Velpeau refers to a most conclusive case, on the authority of Lauth of Strasburg, in which a tumor of fungous cha-

* On the Blood, vol. ii. p. 337. 1812.

† Rostan, Ramollissement du Cerveau.

‡ Loc. cit. Encycl. Wörterb. S. 581.

§ On Dis. of the Eye, 3rd edit. p. 228. 1824.

racter had formed between the tables of the parietal bone. The diploe is commonly the immediate seat of the morbid formation in these cases; but Graff's case, as well as the admirably minute description by Ebermaier, of a cranial tumor, shows that the compact substance of the tables may be its nidus. This latter fact has been further demonstrated by a case recorded by Osius: here a great number of tumors were seated in corresponding points of the internal and external laminæ of the bones, while the interjacent diploe had escaped contamination.

In certain cases of this class, the bony structure undergoes remarkable alterations. Thus, in a very singular one, described by Cruveilhier,* (the frontal, ethmoid, nasal, and inferior turbinated bones, the body and wings of the sphenoid, the pituitary membrane, and part of the dura mater were implicated,) the substance of the bones, in the situations where the disease had advanced furthest, had completely disappeared, the mass yielding to a knife like the soft tissues. A section of the morbid parts exhibited an areolar aspect, almost as perfect as that of a honeycomb, the areolæ being filled with a substance of the consistence and colour of tallow. The bony tissue had evidently first undergone the primary morbid change, rarefaction, and subsequently been removed by absorption,—the form impressed on the morbid matter by the dilated cancelli being retained throughout. A morbid mass having some textural analogy to this, is described by M. Dubreuil.

5. *Sub-pericranial cellular tissue.*—The chief tumor in Chelius's second case (that of a woman aged 58) was seated between the pericranium and bone, connected with the fibrous membrane at its line of union with the skull, and closely adherent to the osseous substance. The latter presented some small openings capable of admitting a sound, but no regular perforation. Chelius considers this growth a production from the pericranium itself; and his third case certainly exhibits rather strong evidence of the possibility of such origin. Blasius has also admitted, apparently however, without having himself witnessed the fact, that the pericranium may be the primitive seat of the affection. On the other hand, Ebermaier, in his latest production,† questions the existence of pericranial fungus as a distinct formation. Chelius's cases seem at least to prove that cancerous growths may arise in the tissue lying between the skull and its fibrous investment; and the fact is further established by a case observed by Mr. Langstaff many years back,

* Anat. Pathol., Livrais. xxi. † Encycl. Wörterb. loc. cit.

wherein "a tumor was found at the vertex beneath the pericranium; it had affected the bone only in a slight degree."* Analogy is in favour of the notion that the sub-pericranial cellular structure, and not the fibrous membrane itself, is the true seat of such cancers.

In some instances the tendency to limitation of the disease to one or other of the different seats, or rather structures, enumerated, is very obvious; in others, several are implicated. Von Walther, indeed, went so far, on the evidence of a single case, as to maintain that the disease was always constituted by a simultaneous change in the dura mater, cranium, and pericranium, especially marked in the blood-vessels of the diploe. In Chelius's third case, all those tissues were evidently, in some situations, included in the morbid change; and such, too, appears to have been the fact in the individual operated on by Sir A. Cooper. On the fallacy of von Walther's notion, as a general proposition, it appears needless to insist.

§ V. The seat of these cancers, in respect of the region of the skull affected, was as follows, in 51 cases analyzed by Velpeau:—13 in the parietal region; 8 in the temporal; 7 in the frontal; 7 in the orbito-nasal; 7 in the occipital; 5 in the vertex; 3 on the petrous bone; 1 in the substance of the falx cerebri. Tumors of the *internal* surface of the dura mater, in particular, have been most frequently met with by Cruveilhier at the angle of union of the falx cerebri with the rest of the membrane, when seated at the convexity of the skull; in the olfactory groves, the sella Turcica, and the surfaces of the petrous process, when occupying the base. They have been seen on the tentorium and surface of the straight sinus. M. Vingtrinier records a case in which the centre of the new growth adhered to the bulb of the jugular vein, escaped by the foramen lacerum anterius underneath the muscles, extended within the skull as far as the anterior clinoid process, and sent a process eighteen lines long into the right lateral and petrous sinuses: the patient was an idiot from birth.

§ VI. The *number* of tumors existing in each case varies. It appears from M. Velpeau's inquiries, that they are commonly single, as had been already affirmed by Meckel; twelve examples only of multiple development presented themselves in sixty cases. They are sometimes very numerous; Sandifort found eighteen, Ritterich fourteen in one subject, and cases almost similar have been observed

* Med. Chir. Trans., vol. iii. p. 288. 1812.

by others. Cruveilhier* speaks of having discovered one hundred in the diploe of a patient with mammary cancer.

§ VII. Cancer in this situation is rarely attended with development of the disease in other parts. Among sixty cases Velpeau only found three in which other organs were similarly affected;—some of these cases cannot, however, I am persuaded, be fairly received in evidence, so imperfect are the details accompanying them.

§ VIII. Concerning the *causes* of the disease, nothing can be said to be satisfactorily ascertained. Numerous writers gratify their fondness for universal explanation by ascribing it to blows; but they fail to adduce a particle of evidence proving that the disease had not existed before the receipt of the injury. Local violence appears, however, in some cases, to have clearly hastened the occurrence of protrusion. Abernethy, true to his general doctrine, conjectures that an effusion of blood from a blow might become organized, and form a "fungus;" but he had not himself observed any facts in support of such a view.† Were this notion (which has, in its general bearings, been already considered, p. 37) established, the influence of external injury would be clearly defined. Some persons attribute the affection to the venereal cachexia; others, (such as von Walther, who looks on it as identical with the white swellings of joints,) to the scrofulous: both opinions, merely hypothetical at the best, are disproved by observation.

The affection has been met with in the two sexes with about equal frequency; twenty-three of the subjects of forty-four cases, collected from different sources by Velpeau, were males, twenty-one females. It is observed at every age, as the following table of forty cases, by the same writer, fully shows:

Age.	Cases.	Age.	Cases.
From 0 to 10	6	40 to 50	9
20 — 30	7	50 — 60	5
30 — 40	10	60 — 80	3

§ IX. It will be necessary to examine separately the *symptoms* of meningeal cancer while within the skull, and after its appearance in the form of a tumor externally: with the signs and symptoms of the latter may be united (in order to avoid minute divisions) those produced from the outset by cranial and sub-pericranial cancer—care being taken to point out the more important peculiarities characteristic of the disease, when thus localised.

Before perforation.—Like intracranial tumors generally, menin-

* Anat. Path., Livrais. xx. Os. p. 4.

† Surg. Observ. on Injur. of the Head, p. 58. Ed. 1826.

geal cancer usually produces no symptoms in its early stage: the pressure undergone by the brain is attended with no interruption of its functions, either on account of the slow growth of the tumor, or of the cerebral atrophy which proceeds *pari passu* with the enlargement of the adventitious mass. At a certain period, (variable, however, according to a well-known peculiarity in cerebral pathology,) the compression produces manifest effects, and these may occur so suddenly, and assume such a character, as to simulate the symptoms of an attack of cerebral hæmorrhage. Thus, sudden loss of consciousness, followed by hemiplegia, has been noted as an effect of meningeal cancer, or rather of the anatomical changes to which this gives rise. But in other cases—and these, fortunately for the facilities of diagnosis, would appear to be of much more common occurrence—the phenomena of compression arise gradually; the powers of feeling and motion in the limbs diminish by almost imperceptible degrees, and are finally lost; while the intellectual faculties undergo a chronic process of stultification merging in complete idiotcy. In some instances, the patient seems to be in a state of intellectual torpor only, and is capable of being roused into imperfect mental manifestation; he will, for instance, return monosyllabic answers to simple questions. In another class of cases the foreign body acts as an irritant, and produces some one of a variety of morbid effects, announced by the supervention of severe pain and convulsive movements in the paralyzed limbs, or epileptiform attacks, which occur with greater or less frequency and violence. If these symptoms have been preceded by constant cephalalgia in a fixed spot, the existence of intracranial tumor is rendered still more likely. The irritative changes thus produced—inflammation of the membranes, serous effusion under the cerebral arachnoid or into the ventricles, common or capillary apoplexy, and white pultaceous or straw-coloured gelatiniform softening of the surrounding brain—are the most ordinary immediate causes of death in these cases: the cancerous nature of the tumor rarely, if ever, proves the cause of the fatal result.

But masses of fibrous, calcareous, or of tuberculous matter may give rise to a similar train of phenomena; the question arises whether there are any means whereby the cancerous nature of the growth may be distinguished. Tubercle rarely, even more rarely than cancer, forms into masses in connexion with the meninges,—a circumstance which may help in the diagnosis. And the general principles already laid down in respect of the brain (p. 497) are perfectly applicable here.

When opportunities occur for making a post-mortem examination, in this stage of their progress, of tumors originating from the internal surface of the dura mater, these productions are in almost every instance found non-adherent to the substance of the brain; in some cases there is no adhesion visible between the cerebral and parietal arachnoid; in others these layers and the pia mater are firmly united, or false membranes present themselves in the cavity of the serous sac.* Some one or more of the changes already referred to are discovered in the brain, when irritation of that organ has been the immediate cause of death.

But when, instead of growing inwards, cancer of the *internal* surface of the dura mater presses forcibly on the cranial substance, absorption and perforation, as has been already mentioned, follow. The characters of the protruding mass and of the perforation deserve notice. In one of Cruveilhier's cases, in which a distinct elevation was discovered under the scalp (but not till after the patient's death), the tumor, forming a spongy mass, consisted of a dense fibrous lamina, and a multitude of osseous vegetations mingled with softened matter. The skull was widely perforated; the internal table destroyed and replaced by encephaloid pulp to a considerable extent round the opening, the external converted into a thin elastic scale within the same limits. Here the cancerous nature of the malady might almost be predicated with certainty, if the fact of perforation were established; but the protrusion might easily be mistaken for a fungus from the *external* surface of the dura mater—an error committed in the very instance referred to. I am not aware of any means by which the distinction could be made in the living body: the mode of destruction of the bone is in both instances subject to the same variation. The cranial substance may either soften from carcinomatous infiltration; the internal table and diploe may alone be destroyed; or, in addition, the external table be rarefied and rendered cribriform from numerous minute perforations; or, as is the most common case, gradual absorption be effected in the same manner as in the instance of post-osseous aneurism. From the direction and manner in which the opening is formed, it naturally follows, that this should be much narrower externally than in-

* Unless as a consequence of the presence of a tumor, this morbid state of the arachnoid is scarcely ever met with. M. Louis (Traité de la Fièvre Typhoïde, 2e édit. tom. i. p. 348; Paris, 1841,) has examined the brains of upwards of one thousand subjects, and only once discovered such adhesions either on the surface of the hemispheres or in the interior of the ventricles; and in this instance they were of trifling extent.

ternally, the tables of the bone appearing bevelled off from without inwards. The edge of the outer table is usually thin, sharp, and uneven. While the process of destruction goes forward, rugged and irregular spiculated bony vegetations sometimes form on the external surface of the cranium. However compact the bony tissue may be, it is incapable of resisting this perforative process: instances, by no means few in number, have been placed on record, in which cancerous growths forced their way through the petrous process into the meatus externus.* In cases where the walls of the nares have been perforated, epistaxis has almost constantly been noted.

After perforation.—The cancerous formation having thus overcome the firmest obstacle in its way, protrudes through the adventitious foramen in the form of a fungous tumor. This tumor may possess one or more of several characters. which, if combined in any number, are pathognomonic of its nature. It presents the lobular surface and soft elasticity of encephaloid; it is immoveable, yet non-adherent to the skin, which itself retains its natural appearance. In point of size the tumor varies exceedingly—at an early period hardly so large as a nut, it may eventually acquire, as in Grima's case (Louis), the dimensions of "a second head." When the protruding mass does not bulge out far beyond the edge of the perforation, the irregular borders of the latter may sometimes be distinctly traced. It is the seat of two kinds of pulsation—one of these synchronous with the arterial pulse; the other corresponding to the rise and fall of the brain accompanying expiration and inspiration. The tumor may be pushed within the cranium either wholly or in part, a change in its position giving rise to symptoms of cerebral compression: when left to itself, it recovers its previous appearance and size. It is not usually tender under pressure, but is frequently the seat of darting pain; Louis, the Wenzels, and Boyer, suppose this to be produced by the sharp edge of the bone, and state that it may be relieved by *gentle* pressure.

As the size of the tumor augments, the skin becomes tense, discoloured, and thin, and finally opens; the fungous growth protrudes, and the usual phenomena of such ulcers are exhibited. Death has, however, usually occurred, before the disease had reached this stage. Before the protrusion of the fungus, a peculiar crepitus is heard on pressing the attenuated bone covering it: this sensation is afterwards perceived within the limits of the destruction of the

* See, for instance, Thibault, Thèses, No. 133. Paris, 1816.

inner table and diploe. The appearance of the tumor on the exterior of the skull is sometimes sudden, and may be accompanied, as in Robin's case (Louis) with severe symptoms—vomiting, hiccup, small pulse, and cold extremities.

But almost all these symptoms may be absent. According to Velpeau, the *expiratory* elevation will be nearly always wanting, if the dura mater possess its natural powers of resistance, if the tumor be not prominent internally, if it traverse a thick bone, if it be not broad-based, or if it be tightly compressed between the dura mater and the integuments. Chelius's first case shows that the growth may be easily reducible, and yet unaffected by the respiratory movements. Whether the *arterial* motion depend on transmission of the cerebral vascular pulsation or on intrinsic pulsation is undetermined; but it may be absent altogether. It must not be confounded with the individual beating of vessels ramifying on the surface.

If the mass communicate with the interior of the skull by a narrow pedicle, it is irreducible: adhesions and thickening of the dura mater will sometimes produce a similar result. Under these circumstances pressure on the tumor produces no effect on the cerebral functions: this is easily intelligible. But Espinosa reports a case from the practice of Dupuytren, in which almost complete reduction of the tumor within the skull produced none of the symptoms of compression; and in Chelius's first case a similar peculiarity was noticed.

In Ebermaier's case of fungus sprouting from the substance of the *brain*, the disease first presented itself externally as a painful, doughy tumor, about half as large as a walnut; at a later period, the protruding growth could be pushed into the cranium without producing any apoplectic symptoms; a motion distinctly corresponding to the expiratory elevation of the brain existed in the tumor. The case was attended with various symptoms of cerebral disease, and terminated fatally about a year after the occurrence of protrusion.

The following is Ebermaier's description of the course and symptoms of the disease when originating in the substance of the *cranium*. Without appreciable cause, either local or general, in the majority of cases, sometimes, however, in consequence of a cachexia [diathesis], at others of local injury, without pain, cerebral symptom, or inflammation of any kind, a hard, accurately circumscribed, immoveable tumor, non-adherent to the skin, is developed in a variable point of the skull, causes no inconvenience for a length of time, but does not yield to treatment: it has all the characters of an ex-

ostosis. The whole mass continues to grow, containing as its nucleus a sort of skeleton of osseous lamellæ prolonged into fibrous cellular tissue, between which encephaloid matter accumulates; these lamellæ sometimes produce an appearance resembling that of the sea-hedgehog.

The tumor remains without change until death, circumscribed, solid, immoveable; there is no trace of osseous edge at its base—the cranial bones appear on the contrary continuous with it. Here there is no pulsatile movement; there is no aperture felt in the skull; the tumor cannot be reduced, nor does pressure on it affect the cerebral functions in the smallest degree. The case from which this description is drawn up terminated fatally in eight months after the first appearance of the disease. Cruveilhier's case of cranial cancer was of much longer duration, and life was in all probability cut short by an injudicious operation.

When the morbid production forms in the *sub-pericranial cellular tissue*, it will neither present any respiratory movement, nor give rise to cerebral symptoms when pressed on, and will of course be irreducible.

If the disease originate simultaneously in the sub-pericranial cellular tissue and on the external surface of the dura mater, the bone becomes implicated by extension of the morbid change to both its tables; the diploe is last affected. When the destruction of the bone is complete, pulsation may be distinguished, as in cases of ordinary perforating cancer of the dura mater. (Chelius.)

§ X. Carcinomatous tumors presenting themselves on the surface of the skull, are liable to be mistaken for encephalocele, erectile tumors, aneurism, common encysted tumors of the scalp, abscess, and cephalhæmatoma.

Encephalocele is accompanied with both kinds of pulsation adverted to; but, unless the result of accident, it is almost peculiar to new-born infants, and the facility of reduction, together with the relief of symptoms following such reduction (unless pressure be too forcibly made), will generally distinguish it from perforating cancer. It is more frequently pedunculated than cancerous growths, and, unlike encephaloid, is of equable consistence in its entire extent. The opening in the skull is smooth and even, whereas the edges of a cancerous perforation are irregular and denticulated. Lastly, an encephalocele is, with the rarest exceptions, seated on the sutures or fontanelles,—localities in which perforating cancer is not observed.

Erectile tumors of the skull rarely attain any size without affect-

ing the condition of the skin; and their pulsation may, in general, be diminished, or even stopped, by pressure of the external carotid. (Espinosa, Velpeau.) Similar pressure, however, sometimes produces a like effect on protruding cancer: the pulsation of the fungus situated over the ear, observed by Orioli, was stopped by pressure on the temporal artery. Erectile tumors are more under the influence of the general circulation than fungous growths, swelling under all states of undue excitement of the heart's action; they may be, as in the remarkable case of cranial disease figured in Cruveilhier's 33rd Fasciculus, the seat of a strong blowing murmur.

Tumors composed of the small arteries and veins of the scalp in a state of general dilatation (an interesting example of which state occurred some time since at University College Hospital, under the care of Mr. Liston) may be distinguished by their number, their erectile character, and the unaltered state of the skin investing them. As to the existence and characters of blowing murmur in such cases experience has not yet decided.

In one of the cases related by Louis, and in that observed by Orioli, the affection was mistaken for an *aneurism* of the scalp; the usual existence of a blowing murmur, the absence of opening in the cranium, and the effects of pressure of the trunks of the scalp might—coupled with careful investigation of the commemorative signs, would—prevent this error. It would appear almost impossible to avoid mistaking a perforating aneurism of the middle meningeal artery for a fungous growth; but the very different error of confounding this arterial affection with an encysted tumor of the scalp (which has actually been committed*) is less intelligible, and infinitely less excusable.

Encysted tumors of the scalp are distinguished by their mobility, and the absence of affection of the bone; *abscess*, by the presence of signs of inflammatory action, and by the mode of formation of the swelling to which it gives rise.

If occurring in a new-born infant, the protruding mass is liable to be confounded with *cephalhæmatoma*;† but fungus of the surface

* Cyclopædia of Surgery, art. Aneurism, p. 264.

† For further information on this subject see the art. Cephalhæmatoma in the Cyclopædia of Practical Surgery. The further experience I have had of that uncommon affection, since the publication of the article in question, confirms the opinion I then expressed concerning its mode of production,—that "the effusion of blood *mediately* depends upon imperfect development of the external table of the bones and lax adhesion of the pericranium; *immediately* upon any causes effecting

of the skull is so extremely rare at this age, that such error is little to be apprehended. I am acquainted with but two facts, which prove that perforating cancer has ever presented itself in new-born infants: one of these is the case related by Schnieber; the other, the existence of a congenital spongy tumor, originating from the outer surface of the dura mater, and protruding through the skull, in the Strasburg Museum.*

§ XI. The *seat* of the tumor, admitting the fact of its existence to be established, is, previously to the occurrence of perforation, another problem of most difficult solution: the alleged locality of the cephalalgia is often a faithless guide;† and a tumor confined to one side of the cranium may, from affecting both hemispheres, give rise to functional disturbance of both lateral divisions of the body.

a separation between the latter membrane and the bony surface: of these causes circular constriction of the cervix uteri is probably the most frequent, but certainly not the sole one." I am desirous of adding, however, that the imperfection referred to cannot be considered (as M. Valleix maintains) to amount to absence of the external table of the parietal bones, or to constitute a natural and necessary state during the first fortnight of extra-uterine life. I have examined the parietal bones of four infants cut off by various affections within the first ten days after birth, with the special view of investigating this point, and invariably found the external table present, but imperfectly evolved, in so far as it consisted only of parallel fibres with vessels lying between them. This latter appearance is equally obvious on the meningeal surface of the bone,—a fact showing how *primary* internal cephalhæmatoma may occur (I mean, independently of communication with an extra-cranial collection). The diploe was thinner in other parts of the bone than in the protuberance, but existed nevertheless most distinctly. The microscopical structure, even, of the two tables was identical; the corpuscles light-coloured (hence containing little calcareous matter), but equally so in both laminæ.

* Vid. Kilian, Anat. Untersuchungen über das neunte Hirnnervenpaar, S. 127. Pesth, 1822.

† M. A. Severinus (De Med. Efficac. lib. i. part. 2. cap. 3.) refers to the case of a Spanish nobleman afflicted with violent headache which had resisted every kind of treatment; the sufferer consented to the application of the trepan over the seat of the pain. The operation brought into view a fungous excrescence, the destruction of which cured the cephalalgia permanently. But these bold proceedings have not always been crowned with similar success. Mr. S. Cooper "saw Mr. Ramsden trepan a man for a mere fixed pain in one part of the head, on the supposition that there was a tumor under the bone; but no tumor was found, and the operation caused inflammation of the dura mater and proved fatal." The subject of Lauth's case, to which allusion has already been made, had been trepanned before death in the situation of an obstinate local headache, with which he had been tormented: the cancerous growth was discovered in the diametrically opposite part of the skull. On the other hand, Wepfer relates an example of successful issue in a case like that of Severinus. (Obs. Med. Pract. De Affect. Cap. Obs., 48. p. 119.)

When some particular sense is paralysed, we have an aid in localizing the disease; yet over-confidence in the positive or negative information thus obtainable may easily betray us into error. Professor P. H. Bérard * has related a case in which the olfactory nerves were destroyed by the pressure of a tumor, and yet the patient, according to the positive affirmation of the occupants of the beds adjoining his, enjoyed to the last the faculty of smell. Although not established with sufficient certainty to obviate all scepticism as to the reality of its occurrence, the presumed fact was seized with avidity by M. Magendie as a triumphant argument in favour of his doctrine of the functions of the fifth pair of nerves. In Graff's case there was a peculiar sensation of cold experienced in the throat and stomach, so that the hottest food seemed iced: a tumor was detected pressing on the medulla oblongata, the glosso-pharyngeal and vagus nerves. In a case of intra-cranial carcinoma destroying the trunk of the fifth nerve, and related by Mr. Bishop,† a variety of symptoms, depending upon implication of that important trunk, arose, and might unquestionably have furnished materials for localization of the disease.

On the other hand, particular symptoms may help to deceive the observer as to the real seat of the new growth: a patient of Dr. Abercrombie's, for instance, suffered from amaurosis, and the tumor was attached to the tentorium.

Again, when occurring in particular situations, it seems next to impossible to avoid error as to the seat of origin of meningeal cancer. Where the tumor forces its way into the orbit, and detrudes the eye forwards, as in cases by J. L. Petit,‡ by Mr. Travers,§ and by Dr. Mackenzie,‖ it assumes all the characters of orbital cancer. In Professor Bérard's case of destruction of the olfactory nerves already mentioned, in a specimen preserved in University College, and in another instance figured by Cruveilhier (Livrais. viii. pl. 3.), the tumor protruded through the ethmoid bone into the nares: the similarity to a cancerous nasal polypus might easily have deceived even a practised observer. M. Velpeau met with a case in which the mass, first appearing at the inner canthus, soft, fluctuating, without discoloration of the skin, or pain, simulated a lachrymal tumor, and afterwards an orbito-nasal cancer, depressing the eye and protruding into the nares. A similar one is related by Louis, in which the tumor made its way through the os unguis.

* Thèses de Paris, No. 23. 1826. † Med. Gaz., vol. xvii. p. 387. 1836.

‡ Traité des Maladies des Os, tom. ii. p. 325.

§ Diseases of the Eye, p. 411. ‖ Dis. of the Eye, p. 80, ed. 1839.

The enlargement of these tumors sometimes produces very curious deformities of visage, which throw much light (unfortunately of no great practical utility) on their nature and seat. Thus, in a specimen contained in the Museum of University College, where the bones at the anterior part of the base of the skull, with the nares, were chiefly affected, the eyes are detruded outwards, one with an inclination upwards, the other downwards, so as to alter completely the axes of the eyes. In a case evidently similar in character, figured by Chelius, the patient suffered from diplopia.

§ XII. The *duration* of the disease differs extremely in different instances. Graff's patient had suffered thirty-seven years at the time of her death; Louis speaks of a case which lasted forty years; others have been known to exist for thirty, fifteen, and ten: but its ordinary course is much more rapid. The slow course of the disease in the cases referred to, may, on first view, appear an argument against its cancerous nature; but Graff's narrative is precisely one of those which, by their precision and minuteness, place the encephaloid character of the malady beyond the reach of controversy.

§ XIII. I have already described the ordinary *mode of death* in cases of internal meningeal cancer; the description will, in the majority of instances, apply to the protruding species, which rarely destroys the patient with the ordinary phenomena of external carcinomatous disease. I have constructed a table (given further on) which shows, that, in twenty-one at least of the cases on record, the cerebral symptoms preceding death were brought on by various operations, or attempts at operations, on the tumors. When these patients perish rapidly, the dura mater or surface of the brain is frequently found inflamed, covered with pus, ulcerated, softened, or reduced to a putrid detritus; in other cases there is purulent infiltration of the arachnoid, extending to the occipital foramen, with apoplectic effusion into the brain.

§ XIV. Upon the inutility of resolvents, and local applications of all kinds, it is unnecessary to dwell.

Compression originally, as I believe, employed from the disease being mistaken for encephalocele, and apparently warranted by the result of a curious case related by Louis (the benefit derived, no doubt, mainly depending on the replacement of the tumor within the skull), is generally denounced by modern writers. I cannot help thinking, however, that moderate pressure, judiciously applied (so as to avoid all chance of cerebral compression) and carefully watched, ought to be tried (unless there be some especial contra-in-

dication), not certainly with the expectation of effecting a cure, but with the well-grounded hope of curbing the increase of the mass. And this more especially, as we shall find that the therapeutic art is otherwise powerless in such cases.

The destruction of the tumor has been attempted in many instances by acting upon it with caustic. Five out of six cases, treated in this way, and collected by Ebermaier, terminated fatally, almost immediately: in the case with successful issue, related by Eck, doubts are legitimately thrown out by Velpeau, whether the disease was really cancerous.

Ficker describes an example of apparently successful ligature; Velpeau questions the carcinomatous nature of the disease in this instance also. In other cases the constriction of a ligature has been followed by convulsions; Mr. S. Cooper mentions his having observed the fatal effects of this mode of operation exemplified at St. Bartholomew's.

In order to place, in the very strongest light, the disastrous consequences to be expected from merely incising these tumors, or from a partial attempt at their removal, I subjoin a tabular view of the results in a number of instances in which such measures were had recourse to.

REFERENCE.	OPERATION.	RESULT.
AMATUS LUSITANUS. (Centur. 5. Obs. 8.)	Incision.	Death in convulsions 2 days after.
CAMERARIUS.	Opening with caustic.	Death on 3rd day.
AMBROISE PARE. (Louis, p. 10.)	Opened for an abscess by a barber.	Death on 2nd day.
PETIT. (Louis, p. 13.)	Opening with caustic potass.	Death a few days after.
SIVERT. (Louis, p. 14.)	Incision.	Draining hæmorrhage, death on 2nd day.
REY. (Louis, p. 21.)	Tumor incised crucially.	Stupor after operation, continuing until death, on 5th day.
LEGRAND. (Louis, p. 23.)	Caustic applied.	Convulsions and death on 8th day.
CHOPPART. (Louis, p. 31.)	Central incision.	Death in less than 24 hours, without convulsions or pain. (Infant, æt. 2.)
SALTZMANN. (Louis, p. 34.)	Partial removal of tumor.	Death on 11th day.
VOLPRECHT. (Louis, p. 36.)	Incision of skin and pericranium; one-third of the bony circle, but none of the morbid growth, removed.	Lingering death, with cerebral symptoms.

REFERENCE.	OPERATION.	RESULT.
PHILIPPE. (Louis, p. 43.)	Tumor incised.	Death a few (6 or 8) hour after; slight delirium and convulsions.
HEISTER. (In Kauffmann.)	Opened with caustic.	Hæmorrhage,—convulsions,—death in about 24 hours.
VON WALTHER.	Incision of base, hæmorrhage, and ligature of ten arteries; 2 lbs. of blood lost.	Cicatrization; patient alive two years after; the tumor only slightly enlarged.
SIEBOLD.	Attempted removal.	Death under the knife, from hæmorrhage and convulsions.
SIEBOLD.	Incision from one end to the other of the tumor.	Death on the 4th day.
ASTLEY COOPER.	Tumor partially removed.	Fever; coma on the 4th, death on the 6th day.
KLEIN.	Tumor punctured with a trocar, and 4 ounces of blood drawn off; then incised in its entire length.	Death on the 4th day.
SCHNIEBER.	New-born infant; tumor removed by the father with a razor, as close as possible to the base.	Gradually reappeared without affecting the child's health.
	Again removed to the level of the bone; the patient ætat. 5.	The fungus reappeared, and was as large as before on the 11th day; death on the 15th.
GRAFF.	Removal to level of skull.	Patient lived 6½ months, when the tumor had re-acquired its original size.
WISHART.	Crucial opening made.	Fungous growth sprouted out in 3 days; death on the 14th.
LOBSTEIN.	Tumor incised for an abscess.	Constant sanguinolent discharge; death in about three months.
TRAVERS.	Tumor incised for an abscess.	Free hæmorrhage; "death quickly followed."
CHELIUS. (Case 4.)	On first incision, tremendous hæmorrhage; a large part excised; obstinate bleeding (April 1826.)	Wound almost closed 6 weeks after: but tumor then larger than before operation; pulsatile, painful, and the seat of frequent hæmorrhage.—Death December, 1827.
AMUSSAT. (Cruveilhier's case of cranial cancer.)	Partial extirpation.	Reproduction;—death in one year.
JOBERT.	Removal to level of skull; actual cautery applied to the bone.	Disease returned in a month. (Case afterwards operated on by Bérard, jun.; death following in 34 hours.)

REFERENCE.	OPERATION.	RESULT.
ORIOLI.	Imperfect removal.	Rest removed by gangrene: recovery.
HAWKINS.	Puncture of the tumor.	Death in three weeks.

There can be little question in the mind of any one, after a perusal of these columns, as to the fitness or unfitness of incising, applying caustic to, or partially removing these tumors. If any operation be admissible, it is hence, evidently, the complete ablation, and this only of the diseased growth. And if (setting aside for a moment the general question of the propriety of cutting away cancerous structures) we look to past experience for facts justifying such extirpation, we shall find none to encourage us in pursuing or recommending the practice, or to authorize the surgeon in regarding the affection otherwise than, with Ebermaier, as a *noli me tangere.* The successful issue in the cases of Severinus and Wepfer must be looked on as a fortunate chance; of the only two operations, as I believe, performed of late years—those by M. A. Bérard and Orioli—the latter, it is true, terminated successfully, but the other fatally, in thirty-four hours. The operation, however, can neither claim the honour of the recovery in the one case, for this was the accidental effect of gangrene attacking a portion of the tumor which the operator had been unable to reach; nor can the judiciousness of operating in general be denied on the score of the disastrous issue of the other, for from the size of the tumor (sixteen applications of the trepan, an interval of one or two lines being left between each pair of circles besides, were required) the case was unusually unfavourable for operation. As to the opinions of writers on the point, we find Boyer recommending extirpation in but a very few cases; Delpech rejecting it altogether; Richerand advising it only when the growth is seated at the upper part of the head; Velpeau confining it to tumors with a narrow base, and which only require removal of the bone without implication of the dura mater. There can be no doubt of the theoretical propriety of the last opinion, and in the instances of sub-pericránial and cranial cancer it may be carried out in practice, as it is not impossible to distinguish these from the more deeply seated forms. But I have already stated that there is no diagnostic mark whereby fungous protrusions growing from the internal surface of the dura mater or deeper parts may be distinguished from those springing from the external surface of the former texture. If, however, upon removing the surrounding bone, the operator should discover that the deep surface of the dura, or even the pia, mater were involved, Cruveilhier and

Velpeau both agree in the propriety of removing these membranes; in fact, where the operation has advanced so far, there seems no other course left to be adopted.

If the operation be determined on, the investing skin should be divided by a crucial incision and the flaps dissected back sufficiently far to allow of the application of the trephine round the tumor. If there be any unsound skin, this should be carefully removed; effectual removal is of greater importance even than the preservation of skin for covering the exposed dura mater or brain. The extensive exposure of meningeal surface must, nevertheless, prove a most serious obstacle to success: a writer in the Gazette Médicale, commenting on this, inquires whether the evil might not be remedied by a plastic operation; but experience upon this subject (p. 242) gives little weight to the suggestion.

Bérard performed his operation on two successive days: on the first occasion three quarters of an hour were occupied in applying the trepan six times: on the second, an hour and a half in the remaining ten applications. This mode of dividing the operation might be imitated where the growth is very large; but such dimensions undoubtedly form a special contra-indication to its performance. A remarkable circumstance attending Bérard's operation was, that, on the removal of the mass, the ordinary symptoms of *compression* of the brain came on; the patient was restored to consciousness by firm pressure on the part of the hemisphere corresponding to the seat of the morbid growth. This physiological fact may be usefully compared with Magendie's experiments on the cephalo-rachidian fluid.

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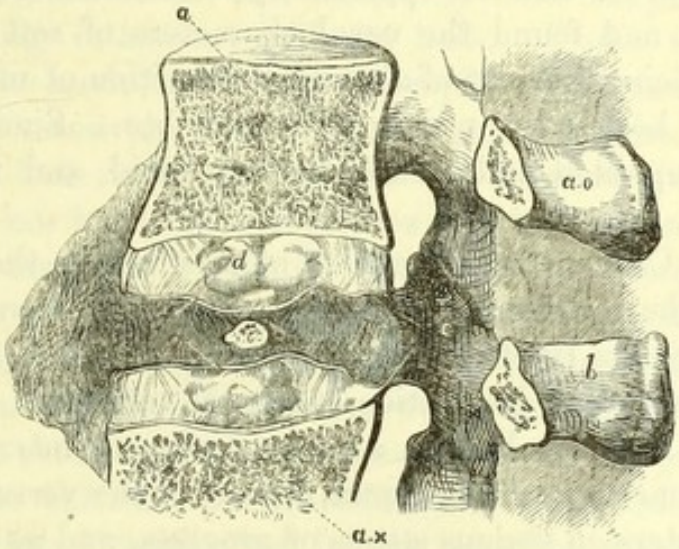
SECTION III.

SPINAL COLUMN, SPINAL MENINGES, AND MEDULLA.

SPINAL COLUMN.

§ I. I HAVE already had occasion, in describing cancer of the lungs, to refer to a case which occurred, under Dr. Taylor's care, at University College Hospital, and which demonstrates several interesting facts bearing on the history of carcinoma of the vertebræ.

A vertical section of the portion of the lumbar spine affected in this instance exhibited appearances, which are rudely delineated in the accompanying cut. The body of one of the vertebræ had



Vertical section of cancer of the spinal column:—(a, a ×) two lumbar vertebræ; (a o) spinous process of vertebra (a); (b) spinous process of vertebra, of which the fragment (i) forms the residue; (c) spinal canal; (d, e) two intervertebral fibro-cartilages; (f, g) thin plates of cartilage forming the boundaries of the latter; (h, h) the cancerous mass; (i) fragment of body of a vertebra.

obviously been the primary seat of the disease; with the progress of infiltration the bony tissue had disappeared, and the adventitious substance, reaching the anterior and posterior limits of the cancellated structure, destroyed the compact tissue also, and protruded posteriorly under the dura mater into the spinal canal, and anteriorly under the anterior ligament. It had subsequently grown in front of the spine in an upward and downward direction, so as to reach the bodies of the vertebra next above and next below. The fact of the destruction of the body and arches of the vertebra referred to, was rendered obvious by the looseness of one of the spinous processes (*b*),—it was, in truth, without a corresponding body; had this not been ascertained, the osseous fragment (*i*) constituting the residue of that body, and seated amid the cancerous matter between two intervertebral cartilages, might have been mistaken for a new formation. The adjacent intervertebral cartilages had undergone irregular pressure and condensation, but were perfectly free from cancer; their proper tissue was bounded inferiorly and superiorly by a thin lamina, possessing the microscopical characters of cartilage, and into which their component fibres seemed set at right angles. The cancerous product was composed of a fibrous stroma, having its fibres arranged almost rectilinearly, and containing creamy, sanguineous pulp in its meshes: in other words, it was of the scirrho-encephaloid species.

Encephaloid cancer may implicate a considerable number of the vertebræ, as was exhibited in a case occurring in the practice of Mr. Liston, and of which a model is placed in the University College Collection. I had an opportunity of examining the structure while recent, and found the usual characters of soft encephaloid, this product being the seat of abundant deposition of melanic colouring granules, both contained in cells and free. Similar colouring matter was deposited underneath the arachnoid, and in the tissues generally.

Sir Astley Cooper found nodules of scirrhus in the cancellated structure of the vertebræ of a female affected with mammary cancer. Sir Benjamin Brodie many years since described a satisfactory example of cancerous destruction of several vertebræ.

Mr. Cesar Hawkins has, in a recent and very interesting paper, contributed four cases of cancerous disease of the vertebræ, exhibiting its characters in various stages of progress, and as arising under various circumstances.

§ II. It follows from these cases, that the vertebræ are liable to become cancerous from the infiltration, or tuberiform deposition, of scirrhus, encephaloid, or scirrho-encephaloid: no records describe true colloid in this site. In three of eleven cases the cervical portion of the spine was affected, in six the dorsal, in two the lumbar.

§ III. The bodies of these bones suffer more frequently than their other divisions; but the arches, and even processes, are not very uncommonly implicated, and have indeed exhibited the disease to a more advanced degree than the former parts.

§ IV. Generally speaking, from one to four or five vertebræ at the most are implicated; in a case of general cancerous diathesis observed by Sanson* almost every one of the vertebræ contained cancerous substance.

§ V. The soft tissues surrounding the vertebræ are of a nature to resist the process of infiltration; this is well exhibited in the diagram given above. The tendency of the new substance, once it has destroyed the bony structure, is consequently to grow in the direction of the spinal canal, pushing before it the dura mater, and, having reached this, to grow upwards and downwards: the same peculiarities are observed in respect of its progress at the anterior aspect of the spine.

The bones are removed by interstitial absorption, as the new material accumulates; their shell is never expanded.

* Arch. Gén. de Méd., tom. iv. p. 691. 1834.

So long as the disease is limited to the area of the bony structure, the medulla and meninges undergo no alteration. When the cancer makes its way into the spinal canal, it may contract adhesions with the dura mater, and necessarily exercises pressure on the medulla varying in amount with its bulk. Under the latter circumstances the medulla undergoes atrophy, and has been seen reduced to an excessively thin, semi-transparent lamina. Inflammation has not been noticed, either in the nervous substance or its membranes; nor have these structures ever been distinctly found to have become cancerous by contiguity; the "thickening of the dura mater by new growths," spoken of by Mr. Hawkins in one case, I presume to have been laminar deposition of cancer on its surface.

§ VI. I am acquainted with but two cases in which vertebral cancer can be even supposed to have constituted the primary manifestation of the diathesis. M. Cruveilhier (Livrais. xxxii.) contributes one of these, in which the first lumbar vertebra was destroyed by cancer; but the narrative is unsatisfactory, because, though nothing is said of carcinoma in other organs, neither is its absence from them affirmed. The other example appears in the third case contained in Mr. Hawkins's paper. In respect of this case, it does not appear to me perfectly clear from the narrative that the morbid product did not, in truth, originate in the soft parts surrounding the bones, and spread to these parts secondarily; the facts of the comparative healthiness of the bodies of the affected vertebræ, while the arches and processes had wholly disappeared under the influence of the new matter, and also of the extensive implication of the soft parts, (which is not noticed where the disease undoubtedly originates in the spine itself,) I think warrant such doubt. Two nodules of scirrho-encephaloid existed in the liver; in all probability these were consecutive to the vertebral affection.

In all other recorded cases, cancer of the spine has been a secondary development,—a mere evidence of the diathesis. And in the great majority of instances the mamma (in one individual, referred to by Cruveilhier, the testicle) has been the organ primarily affected.

§ VII. In Mr. Hawkins's case of presumed primary cancer of the spine, the first local symptoms were traced by the patient to exposure to cold at an open window; in M. Cruveilhier's, a sudden chill was by the patient supposed to have given rise to her malady: in both instances mere coincidence only can be suspected. In all other cases the only cause which can be stated is the existence of the diathesis.

§ VIII. Mr. Hawkins's patient just referred to was cut off by the disease in about six months from its first appearance. When the vertebral affection is secondary, I am unable to calculate the precise share of influence it may have in shortening life ;—but that it has such influence, and to no small amount, is as obvious from the records of cases, as intelligible from the consideration of the extreme suffering, to which it commonly gives rise.

§ IX. The *symptoms* of spinal cancer may be distinguished into (*a.*) essential and (*b.*) accidental,—the former depending on the osseous disease itself, the latter on the influence it exercises on the adjacent nerves and spinal marrow.

(*a.*) In a case witnessed by Sir Benjamin Brodie, the affected part does not appear, from the account given, to have been the seat of *pain*. In all other instances, on the contrary, pain, at first often simulating that of rheumatism, but eventually becoming more or less constant and acute, (in some instances "exquisite," "excruciating," or "agonizing,") has been observed. With this pain coexists much tenderness under pressure, and, generally speaking, inability to lie in certain positions, and undertake certain movements (according as the cervical, dorsal, or lumbar vertebræ are affected) without various precautions and artifices for momentary support of the parts.

When the soft parts around are implicated, *tumor* becomes perceptible externally; this was the fact in one of Mr. Hawkins's cases. In the individual under Dr. Taylor's care, a hard unyielding tumor, three inches in diameter, and apparently fixed to the spine, was detected in a spot where strong pulsation, and a rasping murmur, were perceptible ; that these depended on mere detrusion forwards of, and obstructed circulation through, the aorta from pressure of a tumor lying behind the vessel, and not upon an aneurism, was inferred from the absence of expansion, murmur, and pulsation in the *lateral* parts of the swelling.

Posterior prominence of the spinous process of a vertebra, which has undergone cancerous destruction, has been observed, and is explicable in the same manner as the like phenomenon in caries. In a case related by Mr. Hawkins (where the third, fourth, and fifth cervical vertebræ were implicated) the centre of the neck appeared a little depressed in front.

(*b.*) *Pain* radiating round the neck and over the scalp occurs, where the nerves become sympathetically affected in cancer of the cervical vertebræ. Difficulty and pain in swallowing, as noticed by Mr. Hawkins, may depend upon such affection of the nerves,

or upon the movement conveyed to the bones during the act of deglutition.

The character of the symptoms dependant on the medulla will necessarily vary with the amount to which its tissue suffers. In Dr. Taylor's case, where the cauda equina was simply pressed upon, severe aching pain extended down the thighs to the calves, and especially to the left knee; the lower limbs occasionally felt numb also. Sir Benjamin Brodie's patient was suddenly seized with paraplegia and loss of sensibility below the back two months before death. Six weeks before that event, the lower limbs became affected with involuntary convulsions, remarkable from being painless. The state of the medulla and meninges is not mentioned.

In Mr. Hawkins's case, where the fifth, sixth, and seventh dorsal vertebræ were affected, and upwards of half an inch in length of the medulla had undergone such absorption from pressure, as to be almost transparent in the central part, the following phenomena were observed: total loss of voluntary motion in the muscles of the lower limbs, loins, and abdomen, in the sphincters of the bladder and rectum, many of them being in an almost constant state of tonic, and occasionally of clonic, spasm;—usually involuntary defecation, without consciousness of the passage of the fæces, but occasional feeling of inclination to relieve the rectum;—incontinence, but not partial retention, of urine;—loss of common sensibility below the back, while acute pain accompanied excito-motory action, and was sometimes present without contraction;—permanent increase of temperature (by about four degrees) of the parts below, as compared with those above, the disease;—alteration in the intestinal secretions;—permanent alkalescence of the urine, with paleness and freedom from albumen;*—disposition to sloughing, œdema, and formation of bullæ on the skin.

Sir B. Brodie's patient discharged ammoniacal urine, which deposited phosphate of lime: the fluid is said to have deposited "thick mucus," doubtless pus modified in physical characters by the alkalis present. The urinary organs were inflamed.

§ X. Persons suffering under spinal cancer commonly perish from the cachexia dependant mainly upon the primary affection. They may be cut off by intercurrent inflammations (*e. g.* pneumonia); but this is rare. Where paraplegia exists, gangrene and

* It is to be regretted that the condition of the kidneys is not mentioned in this case, which would have been an excellent one for throwing light on the supposed or real connexion between chronic simple nephritis and the discharge of alkaline urine in all similar states of spinal disease.

sloughing of the integuments hasten the fatal event, and have sometimes proved its immediate cause.

§ XI. It is almost needless to observe, that the treatment of this affection can be only palliative. Moxas are a severe remedy at best, and are not, in my opinion, to be recommended. Blistering the painful region occasionally has been productive of relief, where no tumor existed externally; where the morbid growth had either made its way, or been originally produced in part, beneath the skin, epispastics, as well as iodine frictions, have proved detrimental. Narcotics alone afford real mitigation of the patient's suffering, and even they but too frequently fail to alleviate his pain.

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SPINAL MENINGES.

§ I. Cases have been met with clearly showing that the various membranes of the cord, and the interspaces between them, may become the seat of cancerous formation; I shall adduce evidence of this, proceeding from the more superficial to the deep-seated tissues, and referring to those cases only in which the position of the new substance appears to have been matter of certainty.

1. *Cellular membrane between the vertebræ and dura mater.*—In the case of encephaloid of the spine, stained with black colouring matter, just referred to (p. 526), there were numerous small nodules of similar cancer in the cellular tissue on the external surface of the dura mater. These were unconnected, in respect of continuity, with the diseased bones.

This is the only fact I am acquainted with distinctly demonstrating the isolated development of cancer in this situation. But cases are not very rare in which the tissue in question is found diseased in connexion with growths seated either in the substance of the vertebræ or in the parts external to the spinal column; in such instances it is far from being always easy to determine where the morbid mass took its first origin. When the original nidus is the cellular membrane outside the spinal canal, the morbid substance spreads in the track of the nerves, through the intervertebral foramina, to the external surface of the dura mater, reaching from its point of entry upwards and downwards to a variable extent. Instances of the fact are to be found in the works of Dr. Abercrombie and M. Ollivier.

2. *Internal surface of dura mater.*—Dr. Abercrombie (loc. cit. p. 387) found in the body of a male a spongy tumor of greyish-yellow colour, internally resembling fungus hæmatodes, within the foramen magnum, attached to the inner surface of the dura mater at its anterior and lateral parts. The processus dentatus was carious on the surface, and so much elongated as to project half an inch into the cavity of the cranium; the ligaments were also partially destroyed, so as to allow it to press upon the medulla, which was flattened, but not materially altered in texture. There was no disease in the pharynx, the vertebræ, brain, or cerebellum.

M. Cruveilhier refers (loc. cit. p. 4) to a tumor, apparently encephaloid, attached to the dura mater by a narrow fibrous peduncle, and having the outward aspect of being contained in the arachnoid cavity.

3. *Cavity of arachnoid.*—M. Hardy discovered an encephaloid growth, two inches long, and half an inch broad, in the arachnoid cavity, and attached by tender filaments to the medullary laminæ of the membrane. M. Collin describes a mass of the same species, similarly situated and apparently retained *in situ* merely by its size, for it was unconnected by adhesion with either surface of the arachnoid cavity.

4. *Cellular membrane between pia mater and deep lamina of the arachnoid.*—Dr. R. Reid describes a case in which there appeared a "whitish substance, *very nearly resembling the medullary matter*, effused between the arachnoid and pia mater." Not the slightest rupture of vessels could be discovered in the pia mater; the cortical and medullary substances were deeper-coloured than natural. M. Velpeau has minutely related the particulars of a case in which he found a thin lamella of vascular encephaloid, extending in this situation on the anterior surface of the medulla from the sixth cervical to the third dorsal pairs of nerves. Cruveilhier has figured an ovoid greyish soft tumor, corresponding to the second dorsal vertebra, embracing the anterior surface of the medulla, developed in the sub-arachnoid cellular tissue, adhering rather closely to the deep lamina of the arachnoid, perfectly free from adhesion with the pia mater, simply compressing the nervous substance, of granular structure and ash-grey colour, of the consistence of the grey substance of the corpora striata, readily reducible to a pulp, highly vascular, and referrible to the species encephaloid. The same observer, in another instance, found a similar tumor connected in the same manner with the cauda equina.

Dr. W. W. Fisher has described a tumor (developed in the

cauda equina, — as I believe, in the cellular membrane between the pia mater and the deep lamina of the arachnoid,) which to me appears referrible to the species colloid cancer. The diseased mass had a lobulated form, and presented a great number of vessels on its external surface; the lower portion of the growth exhibited traces of vascularity in the centre, and had "a scirrhous appearance;" the upper portions were softer, and on section were found to be composed of a "grey semi-transparent, jelly-like substance, infiltrated amidst reticulated tissue, and marked with sanguineous striæ, several of which appeared like true vessels." The author plunged a portion of the mass in alcohol, and, finding it retain its semi-transparency, concluded it was not albuminous. This conclusion is, however, an incorrect one; colloid cancer, although essentially albuminous, retains its translucency permanently in alcohol: and the incidental statement of the narrator, that he "has observed in a diseased state of the pyloric extremity of the stomach (the walls of which were greatly thickened) a morbid product, of which the minute structure was similar to that of the section of the tumor in question," corroborates the inference, as to the colloid character of the latter, to be drawn directly from his description.

5. *Pia mater?*—I have not met with any convincing account of the development of the disease in the substance of this membrane.

§ II. In cases of meningeal cancer the medulla itself does not necessarily present any alteration of structure: when spread in a thin lamina amid the membranes, the new matter may not even exercise any pressure on the cord. When a tumor of some size has formed, it presses on the medulla, and occasionally acting as an irritant, give rise to more or less acute myelitis, exhibiting itself after death (an event which it may have materially hastened) with the usual characters of red softening.

§ III. The remarkable feature in the etiology of cancer developed in these situations is its frequent and obvious connexion with blows, falls, and other kinds of external injury. The disease has been most frequently observed in young persons.

§ IV. While the quantity of cancerous substance continues so moderate, as to exercise no great amount of pressure on the cord, it would appear that the disease is not necessarily productive of any symptom.

I am led to believe from recorded cases, that, where the bones and subcutaneous textures were perfectly free from disease, *local* pain or tenderness have not been complained of; were this point of

distinction established by further experience, it would be of obvious utility in localising the morbid growth.

Alterations of sensibility and movement in the parts seated below the region occupied by the tumor, announce the fact of its pressure on the medulla. It is, however, to be remembered that the paralysis existing may be simply and purely paraplegic, and yet the tumor causing it shall be found not in the lumbar region, but in a higher situation,—at the upper part of the dorsal spine for example, as in an interesting case related by Cruveilhier. The cancer may indeed occupy the brain (p. 493), or the cerebellum (p. 499), and yet the paralysis be paraplegic. Pain shooting through those parts, and occurring in paroxysms is observed; with this may coexist numbness and complete loss of ordinary sensation, while the patient is conscious of a feeling of unusual heat or cold in the parts.

Gradually increasing loss of muscular power sets in in the same parts; the limbs appear to the patient stiff and difficult to control; and when he assumes the recumbent posture, the legs tend to retract towards the nates, and the thighs to flex forwards on the abdomen. In some cases with the complete paralysis, which is eventually established, coexists extreme tonic contraction in the directions just mentioned. Painful convulsive movements exist in some cases. The paraplegia is, in a word, of the species painful.

In certain instances, sensibility has been more especially and earlier affected than movement, and *vice versâ;* this no doubt depended on the posterior and anterior division of the cord being successively implicated; but the clinical evidence on the point is not satisfactory. However, in the case of tumor of the dorsal region described by Cruveilhier, the paralysis affected movement only, sensibility was perfectly retained, and the growth was seated on the anterior surface.

Retention and incontinence of urine, with, in some cases, obstinate confinement of the bowels, in others involuntary discharge of the fæces (of the passage of which the patient is unconscious), add to the sufferings endured. The urine becomes alkaline and purulent.

Œdema of the implicated limbs, and ulceration and sloughing of parts submitted to pressure, hasten the patient's destruction.

Certain peculiarities, referrible to the special situation of the morbid mass, or the mode in which it exercises pressure, are observed in particular cases. Thus, Dr. Fisher's patient could not lie on his back, but rested on his hands and knees. In a woman observed by M. Ollivier, a stratum of encephaloid matter, resting on the dura mater, tightly embraced the sheath of the nerves forming the

brachial plexus, causing partial paralysis of both arms, with alternating pain and numbness in one of them. Here the cord itself was not pressed upon. Dysphagia and excessive dyspnœa exist, when the pressure acts close to the foramen magnum.

§ V. Observation has proved the occasional development of at least four kinds of tumor, besides the cancerous, in the spinal meninges,—namely, the simple fibrinous,* the fibrous, the tuberculous, and the acephalocystic. I know of no means except the application of the general principles noticed in connexion with the brain (p. 497), whereby cancerous masses may be distinguished from the first three of these formations. When cysts, containing acephalocysts, have acquired sufficient bulk to press injuriously on the marrow, and give rise to symptoms, a spot of variable size, furnishing obvious fluctuation, has commonly been found.

Cruveilhier (Livrais. xxxv.) is disposed to believe that paraplegia dependant on pressure of the medulla by intra or extra-spinal tumors is always painful, while that produced by disease of the marrow itself is of the non-painful kind. This observation, taken especially in connexion with that made by myself (p. 532), is, if confirmed, of diagnostic importance; Sir B. Brodie's case (referred to at p. 529) seems, however, to throw doubt upon its uniform accuracy.

§ VI. Persons suffering from intra-spinal cancer are, in the great majority of cases, cut off by gangrene and sloughing of the integuments.

§ VII. I shall terminate the history of meningeal cancer of the spine by a brief account of some cases, in which it is perhaps impossible to determine from what texture the morbid mass originally sprang, but which illustrate the surgical bearings of the subject by showing the connexion of intra-spinal cancer, primary or secondary, with external tumor.

Lecat has recorded a case in which partial excision was performed. G. I., shoemaker, received, in 1750, a violent blow in the loins, after which a "carcinomatous tumor" formed there; the disease destroyed the spinous processes of the four first lumbar vertebræ, and part of the sheath of the medulla. "All these nervous parts [encephaloid matter?], dilated into mushroom-like growths, formed the tumor." It was extirpated in 1751 without loss of blood, but "such a prodigious *nervo-lymphatic* discharge followed from the

* University College Museum, No. 2878.

medulla, that the thickest cloths were saturated." The patient died of exhaustion in two days.

Phillipps relates the case of a youth, aged fourteen, who fell from a second-story window into the street, whereby his back was bruised, but no fracture caused. The sufferer was able to walk with his body bent forward. Three years and a half after the accident he was seized with violent pain in the back, thighs, and legs, and a tumor began to form over the lumbar vertebræ, which increased to a great size; it was red on the surface, and the source of frequent hæmorrhage. Complete paraplegia, incontinence of urine and fæces, &c. supervened, and the patient died six years after the fall. The tumor consisted of encephaloid, and was presumed to have taken its origin from the spinal cord; it had spread upwards, as also downwards, extending from the third dorsal vertebra to the coccyx. Several dorsal and lumbar vertebræ were "carious," and some of the latter had altogether disappeared: there was general softening of all the bones of the spine, of the sacrum, and the ileum.

Knox has recorded the history of a lad, aged fourteen, who fell upon his back against the edge of a chair, became paralytic from below the thorax, and died three months after the accident. A tumor (which attracted little or no attention during life) was discovered after death, consisting externally of two parts, lying on each side of the spine under the muscles close to the bones; on one side the substance had "the appearance of a diseased strumous gland," on the other was merely "a bloody pus." These tumors communicated with a "soft pulpy substance . . . . . at *first suspected to be the medulla spinalis dissolved into a pappy mash*," lying between the dura mater and bones. I recognize here as close a description of encephaloid as is to be expected from an observer of the middle of the last century: the course of the affection, too, was that of a cancerous growth, and neither (as Mr. Hawkins, loc. cit. p. 65, would appear to infer) that of tuberculous, nor of simple inflammatory disease.

In a case related by Wolff, the tumor formed at the upper part of the back; the patient had also had a fall, and suffered from paraplegia and incontinence of urine. Pressure on the swelling (as in other recorded cases also) caused vertigo and a disagreeable sensation in the front of the head. It appears possible that this may have arisen from forcible repulsion, produced by the pressure, of the cephalo-rachidian fluid into the ventricles. A second tumor soon appeared in the lumbar region. On post-mortem examination

the new growths were ascertained to possess the chemical and physical constitution of encephaloid; they adhered to the medulla, which was scarcely softer than natural, though its "investments were destroyed in the corresponding places." The spinous processes of eight vertebræ had totally disappeared, doubtless from cancerous destruction.

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SPINAL MARROW.

§ I. The state of knowledge respecting cancerous disease of the medulla spinalis itself is still extremely defective.

M. Duplay, according to the statement of M. Calmeil, found a small, firm, encephaloid tumor in the nervous substance of the cord.

MM. Hutin and Reynaud are referred to by the same writer as having each discovered a new product displaying the characters of scirrho-colloid in the substance of the medulla. In M. Hutin's case the posterior columns of the cord had given place to a product resembling gelatin or softened horn, which twisted outwards when divided with the scalpel. In the instance which fell under M. Reynaud's notice, the pons Varolii, the left corpus olivare, and the cervical medulla, contained several small circumscribed masses of colloid structure. It is obvious that greater precision of language would have been most desirable here; still, the probability is that the disease really possessed the character ascribed to it.

Dr. Abercrombie quotes from Gendrin a case in which "a firm white tumor, the size of a filbert, enclosed in a cyst, and slightly softened in the centre, was found at the lower extremity of the cord. It lay between the two columns of the cord of the left side, and in some degree encroached upon those of the right; the left anterior column in particular was much distended and flattened by it."

§ II. I have no experience of the symptoms of this affection; and, as far as I have been able to ascertain, they do not differ

(unless, possibly, in the manner already noticed) from those depending upon meningeal cancer of the spinal canal.

In Gendrin's case, just referred to, the patient was a "woman, aged thirty-three, who, after recovering from epidemic cholera, felt great weakness, especially of the lower extremities, with anorexia, thirst, and occasional diarrhœa. Two months later, the motion of both legs was found greatly impaired (especially of the left); the latter was the seat of diminished sensibility and of pain, extending from the origin of the sciatic nerve to the points of the toes; both limbs were affected with a sense of coldness and prickling Soon after this, the patient began to have pain in the lumbar region, succeeded, in its turn, by acute pain in both limbs, with convulsive retraction of the toes. This pain was most acute in the left limb, and there was now increased sensibility of the left foot, so that the slightest touch produced a sense of laceration; and this morbid sensibility afterwards extended to the knee. She had then fever with pectoral symptoms, and died gradually exhausted in October 1832; apparently between six and seven months from the commencement of the disease." It will be observed that this case does not support Cruveilhier's notion respecting the distinction between tumor of the cord itself and the meninges, founded on the character of the paraplegia. It seems to throw doubt upon the justness of my own inference (p. 532) regarding the signification of local pain; but the bones may have been affected, as the absence of such affection is not affirmed.

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SECTION IV.

NERVES.

§ I. Cancerous disease of nerves is singularly uncommon. Their destruction by the progress of a morbid mass in neighbouring parts even is very rarely witnessed; and, when it occurs, is much more frequently of the atrophous kind, from the pressure of adjacent matter, than actually cancerous, from infiltration with the new substance.

§ II. A certain number of cases are on record, in which cancerous growths have been found within the neurilemma of nerves; but when dissection has been carefully conducted, the new material

has in such instances been proved to occupy the cellular interspaces of the nervous filaments, which had themselves undergone atrophy proportional to the existing amount of expansion and pressure. Such tumors belong in respect of practical pathological anatomy, as they do also, by the symptoms to which they give rise, to the nervous trunks.

Further, a perusal of the various contributions on neuromata, while it gives reason to lament the almost invariable deficiency of description of the texture of such productions, makes it matter of conviction, at the same time, that many of them were truly scirrhous, and that the long prevalent delusion regarding the specific character of tumors connected with nerve, prevented those who described them from recognizing the fact. I by no means maintain that all neuromata are cancerous; this proposition would be even less consonant with truth than its converse. I have myself examined some specimens in which the swelling was solely caused by circumscribed infiltration of common induration-matter amid the fasciculi of the nerve: simple fibrous growths sometimes occur in these organs; and cysts containing a gelatiniform, calcareous, or ossiform substance, have likewise been met with.*

§ III. M. Lévêque-Lasource has briefly described a cancerous affection of the fifth pair; the tumor, mainly seated in the sphenopalatine ganglion, was twice as large as the thumb, protruded into the orbit, and exhibited the characters of carcinoma. The superior, and part of the inferior maxillary, branches participated in the disease. M. Bégin states that he has observed a similar cancerous affection of this nerve.

Marandel presented to the Faculty of Paris a portion of the external saphenous nerve converted into a cancerous tumor.

M. Cruveilhier has figured a soft encephaloid tumor, of the size of a small walnut, white, and not obviously vascular, developed in the course of the radial nerve, the filaments of which lay in front of and behind the growth. He was unable to obtain any particulars of the case. In another instance the morbid substance was seated in the internal collateral branch of the median nerve, and contained a coagulum in its interior. The individual presented a great number of cancerous tumors in various parts of the body.

* The so-called painful subcutaneous tubercle (though real neuromata have sometimes been described under this name) is essentially different from true neuroma; the peculiar symptoms attending it originate merely from an accidental connexion with the surface of a nerve.

An aged female, affected with cancer of the breast, suffered under excessive neuralgia, following the track of the branches of the facial nerve. Imperfect facial hemiplegia set in, successively implicating the various parts supplied by the portio dura. All the ramifications of the nerve were, after death, found knotty, and invested with a sheath of cancerous matter of unequal thickness: macerated in nitric acid, the new substance and neurilemma disappeared, but the proper nervous tissue remained, differing in no wise from that of the nerve of the other side. (Cruveilhier.)

Sir C. Bell has recorded an example of encephaloid tumor seated in the centre of the popliteal nerve: "in the interstices of the fasciculated bands a vascular fatty substance could be observed, which resembled marrow."

Pring met with a tumor, the size of a pigeon's egg, having the aspect of a mixture of medullary and fatty matter, increased in firmness by the intermixture of cellular tissue, in the substance of the median nerve.

M. P. H. Bérard found a nodule as large as a small pea in the right phrenic nerve, possessing the hardness of unsoftened scirrhus, and infiltrated with black colouring matter.

M. Ollivier describes a tumor of distinctly scirrhous structure, as large as a hen's egg, seated in the first intercostal nerve.

The size of these tumors varies from that of a pea, to that of a hen's egg, or even larger. They are not pedunculated, as simple neuromata sometimes are.

§ IV. There may be a single nerve only affected; this is the most common case. I have met with but one example of distant nerves being implicated in the same individual; and but one, where nerves, seated close to each other, had both suffered. In the former instance, observed by Heinecke, the right median nerve of a male subject presented a neuroma of large size, and several also existed in the course of the intercostal nerves. In the other case, which was observed by Dupuytren, the fifth pair and portio dura were both infiltrated with encephaloid.

§ V. In the great majority of cases, the affected nerve is the seat of a single tumor only. But Dupuytren found a number in the posterior tibial nerve; and a similar condition of the portio dura, as has just been seen, has been observed by Cruveilhier.

§ VI. In twenty-six cases, where the carcinomatous character of the neuroma appears to have been unquestionable, the nerves affected were as follow:

Musculo-cutaneous	1	Nerve of leg	2
Median	6	Fifth pair	4
Ulnar	1	Portio dura	2
Popliteal	1	Infra-orbital	1
Posterior tibial	1	Optic	2
External saphenous	1	Phrenic	1
Nerve of arm	1	Intercostal	2

Or according to regions:

Upper extremity	9	Trunk	3
Lower extremity	5	Cerebral nerves	9

§ VII. The primary, or secondary, character of the affection cannot be very clearly established from existing records. It appears (a more decisive mode of expression would not be perfectly justifiable) to occur secondarily, and also as the sole evidence of the diathesis. It has certainly been met with in persons having numerous other cancers in different parts of the body. Dr. Warren states that the lymphatic glands become affected: this is to be expected, but I have not discovered any example of the fact. A most interesting case (observed by Moutard-Martin) is mentioned by Bayle, in which the extirpation of a cancerous tumor of the median nerve was followed by the development of a mass of the same nature, which proved the cause of death, in the substance of the brain.

§ VIII. In the greater number of cases the development of these tumors has been referred to local injuries of various kinds: occasionally their formation (or perhaps, more correctly speaking, their discovery) has been preceded by obstinate neuralgia. They are said to be (contrary to what is observed in the case of the painful subcutaneous tubercle) more common in the male than in the female. Narrators of cases often omit to mention the sex of their patients.

§ IX. It is impossible, in the present state of knowledge, to separate the history of the symptoms of cancerous, from those of other kinds of neuromata, or even of the painful subcutaneous tubercle. The affection is at first announced by numbness, sensation of heat, prickling, formication, or pain in the parts amid which the extremities of the affected nerve lie. As its development advances, the tumor becomes excessively tender under the slightest touch; rude contact of any kind gives exquisite torture in the course of the branches of the nerve. It is stated by M. Ollivier, that, when the neuroma is situated near the skin, patients have occasionally noticed a positive increase in size, with reddish or

violet discoloration of the skin, follow local violence of any kind.

Spontaneous pain, occurring in paroxysms of variable length and intensity, but generally more durable and severe in proportion to the time the malady has existed, is also observed. Or very slight influences, such as that of a change of temperature, may act as the immediate causes of a fit of suffering. Convulsions and actual epileptic fits have been produced by these tumors.

Cases of indubitable cancer occasionally run a different course somewhat from that just described; and the whole subject requires additional study. Thus the individual, observed by Sir C. Bell, suffered from intense pain of a burning kind in the sole of the foot, which eventually became of agonizing violence. A sensation of numbness was experienced in the leg, when the man sat down. The tumor itself, seated in the ham, gave no particular pain, when pressed upon, but rather a sense of prickling numbness down the leg: it was of bony hardness. The man died, exhausted from suffering, in about three years after the accident, which led, as it seemed, to the formation of the tumor.

The neurilemma contracts adhesions with surrounding parts, whence the tumor becomes more or less immoveable. Before such adhesions have formed, these tumors are characterised by being moveable from side to side; while they are comparatively fixed in the direction of the nerve.

Special symptoms may be expected to arise in different cases in connexion with nerves exercising special functions. In Bérard's case (phrenic nerve) asthma, and symptoms of angina pectoris, had been present; hemiplegia of the face (following intense facial neuralgia) in Cruveilhier's patient, suffering from cancer of the portio dura; intense deep-seated pain of the trunk (so acute as to cause the patient to commit suicide) in M. Ollivier's case of intercostal neuroma. In a patient observed by Dr. Bright, peculiar spasmodic symptoms appear to have been referrible to pressure upon the phrenic nerve by cancerous masses. (See p. 372.)

The progress of the affection, when implicating a nerve of the limbs, though not commonly remarkable for rapidity, is yet not slow. Dr. Warren observes, that, after the tumor has existed for some time, it may inflame, the superjacent skin ulcerate, and a foul acrid discharge issue in small quantities.

The constitutional symptoms are chiefly those of exhaustion from pain and watching, and suffice to throw those of the cachexia into the shade.

§ X. If, after due consideration of the points already enumerated, any difficulty should exist in respect of the diagnosis of the *seat* of the disease, this may, at least generally, be removed as follows. If the tumor occupy a nerve (no matter what be the amount of pain it habitually causes), it may be handled and pressed upon without giving any annoyance to the patient, after the trunk has been compressed above the situation of the morbid growth.

§ XI. Medical treatment is incapable of removing or even of permanently mitigating the tortures of a cancerous neuroma. Relief may be obtained by three kinds of surgical operation: division (or, better, excision of a portion) of the nerve; extirpation of the tumor; amputation of the limb.

Division or excision of a portion of the nerve above the cancer will remove the *special* pain endured, and prolong life, or at least render brief existence comparatively comfortable—if the patient be sinking under the influence of the cancerous nature of his malady. In advanced cases this palliative measure appears certainly to be the most advisable surgical proceeding: Sir C. Bell does not seem to have thought any other admissible in the instance above referred to. But it is clear that it may become a question whether, from the size and importance of the functions exercised by a given nerve, an operation, causing paralysis of the parts to which it is distributed, be a justifiable proceeding.

If the tumor be free from adhesion, of moderate size, and the constitution not obviously tainted, it may be extirpated. Should the growth be merely encased amid the fibrils of the nerve, without actually involving these, it may be dissected away from its connexions, and the nervous structure left unencroached upon by the knife. If, on the contrary, the nervous filaments be actually themselves implicated, the entire of the affected part of the nerve must be excised. The operation cannot be considered always a safe one; this follows from the case of Moutard-Martin, to which reference has been made.

The only case I have found, in which amputation was had recourse to, is related by the operator, Dr. Warren. It seems to be matter of justifiable doubt, however, that the original disease (although classified as "malignant" by Dr. Warren) was, in this instance, carcinomatous. At the period the limb was removed, an intractable sore existed on the superficial part of the tibia, with swelling of the periosteum and surrounding parts: seven years before a small hard tumor had appeared under the skin in that spot, accompanied with much pain. No ulceration took place till the

fourth year, and then under the influence of caustics. The patient was seen in a good state of health two years after the operation.

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CHAPTER IX.

CANCER OF THE ORGANS OF SENSE.

SECTION I.

SKIN.

§ I. The skin, especially of some regions of the body, is exceedingly prone to destructive ulceration; and much uncertainty prevails as to the precise relation corroding ulcers of this structure bear to cancerous disease.

The condition of the skin preparatory to the occurrence of ulceration of this kind varies. 1. The most common change consists in the formation of an indurated excrescence, which exhibits on section, as was first shown by Scarpa, the characters of ordinary scirrhus. 2. The cutis is the seat of scirrhous infiltration. 3. Ulcerations induced by the continuous action of an irritating body, or of a particular virus (syphilis), sometimes acquire secondarily, in predisposed persons, a basis of true scirrhus, and so assume the disposition and characters of cancerous sores. 4. Another class of ulcers neither originates in, nor is accompanied with, the formation of carcinomatous matter, but nevertheless possesses a corroding and intractable character. Now, in cases belonging to the three first categories, there is no difficulty in understanding why the ulterior progress of the disease should be that of cancerous affections: in the two first it is truly carcinomatous *ab initio*, in the third it eventually becomes so. If it were proved that those of the fourth category possess the properties of such affections, that they are capable of producing special disorganization of the lymphatic glands, and carcinomatous contamination of the viscera, then there would be serious error in making the presence of encephaloid, scirrhus, or colloid, necessary to the existence of cancer; but this has never yet been done, and the sole cause of their having been ranged with cancerous diseases is, doubtless, their intractable, or so-called, "malignant" character. Many simple syphilitic and scrofulous ulcers (nay, even simple irritative sores rendered permanent by the constant action of some irritating cause) should, on the same plea, be pronounced cancers.

The statement of Scarpa respecting the scirrhous nature of the structure composing the cutaneous excrescence may be without difficulty verified. M. Rayer, among others, has found that, incised lengthwise and examined under a common lens, it exhibits the characters of a "lardaceous" tissue, traversed by whitish lines, and analogous in colour to fibro-cartilages. If softened to any extent, a whitish matter may be pressed out of it, and it frequently contains true encephaloid substance.

M. Rayer describes some anatomical varieties of the scirrhous excrescence. 1. His *melanic* variety is nothing more than ordinary scirrhus tinged with black colouring matter; but it is matter for inquiry whether growths of non-cancerous character, liable to deposition of such pigment, may not originate in the skin. 2. *Leucoid* cancer is distinguished by the milky-white colour of the excrescences. Some of these are flat, and depressed in the centre, and prominent at the edge, which is covered with vascular ramifications; others are rounded, and vascular in the centre, while their circumference is of a milky-white colour. Under a lens they appear to be formed of hypertrophous chorion, infiltrated with a milky fluid. Like the melanic variety, they seem to indicate a cancerous diathesis. 3. *Mollusciform* cancer is distinguished by the flatness or slightly-rounded elevation of its tubercles in the centre; they are of the same colour as the skin; their surface is wrinkled, and, in the largest tubercles, the furrows are concentric. Their component tissue is true scirrhus. I shall return to the consideration of this variety, when engaged with the subject of subcutaneous cancer.

§ II. The most common seats of cutaneous cancer, as a primary disease, are the vicinity of the orifices of the mucous canals, the different parts of the face (cheeks, nose, lips, eyelids, forehead), the anus, parts of generation, and scalp. Of its occasional occurrence as the first phenomenon of cancer of the breast, I have already spoken (p. 473). Secondary cancer of the skin of the breast is very common.

FACE.

§ I. Seventy-seven deaths are ascribed to cancer of the face in the Paris Registers, a proportion giving it the ninth place among fatal cancers.

§ II. (*a.*) The scirrhous excrescence or so-called "tubercle" of the face may present the natural tint of the skin, or, as is more common, a reddish or dirty greyish hue, without any, or at least without notable, thickening of the cuticle; it is indurated, firm, and

frequently rests upon a broad basis: varicose vessels in some instances ramify over the surface. It may exist in this state for a length of time, even for years, if unirritated, without being productive of inconvenience; in other cases, the small growth is from the outset the seat of constant pruritus, or burning heat. Eventually it never fails to become the seat of sharp and lancinating pain. If excited, either by being scratched, or injured in shaving, or otherwise, the progress of these excrescences becomes more active—they increase in size, or, should their apex have been laid bare, a thin fluid exudes, which forms a scab; the latter is generally torn away, or drops off, and forms again, while the ulcerative process advances underneath. An ulcer, at first superficial, but ultimately acquiring an excavated basis and elevated edges, exhibits itself; this eventually spreads in all directions, preceded in its progress by carcinomatous induration, and constitutes one of the conditions to which the term *noli me tangere* has been applied. Large fungous formations sprout from its surface in some cases; the discharge is abundant always, but especially so under these circumstances, and copious hæmorrhage is not very uncommon. The vast destruction of parts, including in some cases the bones of the cheek, orbit, and base of the skull, and the globe of the eye, (combined, it may be, with partial paralysis produced by the implication of filaments of the seventh pair,) disfigures the countenance and alters the features in a most striking manner. Strange to say, even in this advanced stage of the disease, it is not exceedingly uncommon to observe a temporary amelioration in its appearance, and a partial attempt at cicatrization, with formation of small florid granulations. In some instances, after excoriation has occurred, the surface of the excrescence becomes finely mammillated, acquiring the appearance of a mulberry (*moriform cancer*), and in this state it may remain for a long period before the establishment of destructive ulceration.

(*b.*) When the affection originates in scirrhous infiltration of the cutis, it may likewise remain for years—ten, twenty, or more—without exhibiting activity (formation of crusts on the surface going forward constantly), until at length, commonly without any obvious cause, deeper abrasion occurs, the ulcerative process attacks the part, and the course of the disease becomes henceforth fundamentally the same as in the former case. But hæmorrhage is rare from the surface, deep destruction is less common, and the pain is less severe, being particularly felt under exposure to the air. It is not very rare for successive crusts to form without the separation of the more superficial having preceded. Large hard greyish concretions

are thus formed, sometimes singularly elongated, and twisted like the horn of a ram; they present transverse sulci, corresponding to the number of layers successively deposited. These horny concretions may also form on the moriform variety.

(*c.*) In some cases of scirrhous infiltration (especially when affecting the surface of the cutis), the appearance of scaly or bark-like incrustation is so peculiar, and to all seeming constitutes so much of the existing disease, that a term has been devised by Dr. Warren* to signify it,—Lepoides, from λεπος bark. But it must not be forgotten that the scale is but a contingent appearance, while the brown and darkish thickening of the skin (displaying the aspect, as I have sometimes seen it, of a common flat mole) is the essential morbid state, giving rise to the exudation which subsequently encrusts. This form of cancerous ulceration is most commonly observed at the side of the nose, towards the inner canthus, and on the temple. I have, however, seen a few examples of it on the prominent part of the cheek.

§ III. The communicating lymphatic system commonly becomes cancerous; but visceral contamination, I am disposed to believe, is less usual and less extensive than in connexion with cancer situated in several other localities. This is especially true of the infiltrated or encrusting variety.

§ IV. The constitutional symptoms are in general obscure, until ulceration sets in; indeed, previously to the occurrence of this change, the health of the patient does not commonly suffer in any perceptible degree. The constitutional disturbance is, generally speaking, less marked than that arising from carcinoma of the breast, uterus, or parts connected with mucous membrane.

§ V. With whichever variety of the disease any given case is to be classified, its duration, after *active* ulceration has set in, very rarely exceeds two years. Death is sometimes hastened by intercurrent erysipelas.

§ VI. Certain affections of the skin, of the class Tubercula, may by possibility be confounded with cancer of the face, previously to, and after the occurrence of, ulceration. These are *lupus*, *tubercular syphilis*, and *Greek elephantiasis*. The diagnostic marks of all four may be concisely given as follows.†

(*a.*) *Before ulceration.*—The tubercles of lupus, of certain forms of secondary syphilis and of Greek elephantiasis (an affection which might almost be omitted here, so rarely is it seen in these coun-

* On Tumours, p. 27.

† See Rayer, Diseases of the Skin.

tries*), are almost always perfectly free from pain; those of cancer, sooner or later become the seat of lancinating pain. The tubercles of lupus, especially, are not so hard as the cancerous excrescence, nor are they, like this, surrounded by an indurated basis. Lupus exedens scarcely ever appears in persons past the prime of life; this is, on the contrary, precisely the period at which cutaneous cancer commonly originates. Cancer commences by a single excrescence, in lupus exedens there are usually several; in lupus non-exedens there are almost invariably a considerable number.

(*b.*) *After ulceration.*—Cancerous ulceration is often attended with considerable swelling of the soft parts, and the neighbouring vessels are dilated and varicose; these sores are besides made worse by the application of escharotics. When the nose is the part affected, the bones also suffer, and exhibit alterations characteristic of cancer; cancerous sores discharge plentifully, instead of being covered with thick dry scabs like those of lupus. The ulcers of lupus, of Greek elephantiasis, and of syphilis, do not occasion pain, like those of cancer.

Common warts are characterised by the thickening of the cuticle which is almost always present, and by the cleft appearance of their surface; they never ulcerate spontaneously.

Simple corroding ulcers are occasionally met with which present many of the characteristics of cancerous sores, and are perhaps only distinguishable, clinically speaking, from these by the rapid recovery which usually follows the removal of a previously undiscovered cause of irritation.

§ VII. The attempt to remove cancerous excrescences of the skin by local depletion is utterly vain. As a late testimony to the correctness of this statement, I may cite the fact, that M. Rayer applied forty leeches round one small and recently formed cutaneous nodule, without producing the smallest effect on it: the patient dying, the growth was found to contain encephaloid matter.

The notorious efficacy of arsenical preparations in obstinate diseases of the skin, perhaps, gives them even more than their average claim to attention in cutaneous cancer.

After the occurrence of ulceration, so long as the sore and its scirrhous basis remain superficial, modification of the former, or destruction of the latter, may be attempted by caustics. Though the knife is the readier instrument of destruction, there is reason to believe, that permanent advantage is more frequently obtained

* See a case by Mr. Curling, Medical Gazette, vol. vii. p. 447.

by escharotic applications. In the choice of an escharotic, the considerations entered into on the general subject (p. 219) will fully apply. When the disease has destroyed the tissues widely and deeply, extirpation with the knife is impossible; and all attempts to remove it with escharotics have no other effect than to add new virulence to the process of destruction. Under these circumstances we are reduced to palliative treatment.

Lips.—See page 255.
Anus.—See page 307.
Skin of the Breast.—See page 473.

SCROTUM.

§ I. The skin of the scrotum is liable to become cancerous by extension of the disease from the anus or penis; but it is also subject to primary development of the affection under peculiar circumstances. Such circumstances are afforded, on the one hand, by the habits of dirt engendered by the occupation of chimney-sweeping; and though soot (and probably other irritants*) is, no matter in what form it be applied, capable of leading to its establishment, the disease has hitherto been so commonly connected with the occupation mentioned, that it is universally known as chimney-sweepers' cancer, Such circumstances are afforded, on the other hand, by constitutional predisposition,—the absolute necessity of which condition is proved by the well-established rarity of the disease among sweeps.

§ II. The uncertainty, already commented on, respecting the intimate nature of various ulcerative processes in the skin generally, has bewildered no few observers of scrotal cancer. In conformity with the views explained in a previous page (p. 544), I believe that this affection may, or may not, be cancerous; and, if it be cancerous, may be so either primarily or secondarily: primarily, if it originate in true scirrhous infiltration or excrescence; secondarily, if an ulcer produced by simple irritation become the seat of scirrhous or encephaloid formation. Of the cancerous nature of the specimen, in which I discovered the following appearances immediately after excision, no doubt can be entertained. Four layers might be distinguished in the mass removed from the scrotum: 1. A stratum of rather firm laminar cellular membrane, presumed by the operator to be healthy; 2. The deep layer of the morbid struc-

* Mr. Curling (Diseases of the Testis, p. 527) states, on the authority of Dr. Paris, that smelters are subject to a similar disease of the scrotum.

ture, consisting of an indurated substance as resisting as fibro-cartilage, creaking like that tissue when the point of a scalpel was rubbed along its divided surface, and possessing a linear arrangement—the fibres being perpendicular to the base; 3. A stratum of much softer material, of yellowish-white colour, lobulated, and possessing somewhat of a fungous aspect; 4. A viscid coating of ichor, of a brownish-grey tint. These layers, more closely examined, presented the following characters. 1. With a common lens, a distinct partition of the cellular layer, by white opaque septa, enclosing yellowish and more transparent matter between them, was plainly discernible. Under a microscope of 150 powers, a particle of this tissue (supposed to have escaped the encroachments of the disease altogether) was found to consist of cells, some irregularly shaped, others pentagonal, and containing a distinct nucleus with attendant nucleoli. Granules floated free in abundance; in one part, an elongated mass, with exactly the appearance of the fibrous matter of carcinoma fasciculatum, (see Plate I. fig. 12) presented itself: it had the transparent character of that structure.* 2. In the fibrous or linear part, caudate corpuscula, with or without nuclei and nucleoli, were abundantly seen, and presented the varieties of arrangement described in a previous chapter (p. 57). These were associated with cells of the description frequently referred to. 3. In this layer, a fibrillar stroma, of the kind represented in Plate I. fig. 13, constituted a most remarkable feature. 4. The ichor contained, in addition to nuclear cells, curved caudate corpuscules, such as those exhibited in Plate I. fig. 7.

§ III. Cancer of the scrotum generally commences in the form of an excrescence (the so-called soot-wart), which may be solitary, or occur in numbers. This excrescence differs in constitution from the common cancerous production on the face; it is more vascular, and possesses none of the dense hardness of the latter. Its truly cancerous nature, *ab initio*, may in many cases be questioned on the evidence of its properties, even as these are visible with the

* This shows distinctly that the germina of cancer (for here they must, *ex naturâ rerum*, have extended much beyond the part examined, which almost presented such characters of the disease as may be detected with the naked eye) are occasionally left behind in tissue, which appears at the time of operation to be perfectly healthy. A remark of the same kind has been made by Gluge: "It is not only," he says, "in the encephaloid tissue itself, of affected organs, that its globules are found; they are also to be discerned in parts apparently healthy; for example, in portions of encephaloid lungs which still retain the property of crepitating." (L'Institut, No. 191, Jan. 4, 1837.)

naked eye. The progress of the local changes may be slow or rapid; ulceration may eventually cause most extensive destruction, including the skin of the perinæum, of the thigh, groin, and abdomen, exposing the corpora cavernosa, and excavating the testicle itself. Small fungous productions, assuming the cauliflower appearance, sometimes (as in certain specimens in University College Museum) sprout up with great luxuriance. Or the characters of lepoides of the face may be assumed; or successive incrustations sometimes occur, as in that region, and remaining attached form a horn-like appendage.*

The pain in this affection is commonly lancinating and severe. Cachectic symptoms eventually set in; death being sometimes hastened by destruction of the coats of an artery, and consequent hæmorrhage. The duration of the disease varies between some months and several years.

§ IV. Contamination of distant organs, and even of the lymphatic system, has, by all observers, been ascertained to be comparatively rare in cases of chimney-sweepers' cancer. But cancerous infiltration of the glands certainly does sometimes occur; a specimen of the kind lies modelled in the collection of University College, and Mr. Curling and others have observed similar facts. I have no difficulty in accounting for this different issue of different cases, believing, as already mentioned, that the disease is sometimes not truly cancerous.

§ V. Although the lodgment of soot in the rugæ of the skin is especially prone to be followed by destructive ulceration in the scrotum, the other portions of the genital organs, the ear (Cusack), the face (A. Cooper), the hand (Earle), and other regions of the body have been the observed seats of its injurious effects.

§ VI. Successive generations of the same family sometimes suffer from the affection. Mr. Earle once removed the diseased parts from a man, whose grandfather, father, and brother had fallen victims to this form of cancer. Mr. Curling alludes to a few other cases of the kind: in one of these, observed by Mr. Cusack,† mother and son (the hand of the former, the ear of the latter) were affected.

No age is exempt from the chance of this disease; Earle‡ has seen it in a boy aged eight. It is said to be most common between the ages of twenty and forty. The ages at death of nine

* See Wadd, Cases of Diseased Prepuce and Scrotum.

† Dublin Medical Journal, vol. xxi. p. 137.

‡ Works of Pott, vol. iii. p. 299.

persons, as recorded in the Reports of the Registrar-General, I find to have been 28, 30, 32, 38, 45, 48, 50, 54, 60.

The action of soot is not only the obvious exciting and immediate cause of the affection, but may lay its remote foundation in a very peculiar manner. Individuals who have in early life followed chimney-sweeping, but, while yet young, changed their trade completely, may in comparatively advanced life become the subjects of scrotal cancer. Mr. Curling's valuable work contains a striking example of the fact.

§ VII. Viewing the question practically, there can be no doubt, that excision of the diseased parts is the proper and the only efficacious mode of undertaking the cure of affections comprehended under the title Cancer scroti. This is obvious from the facts, that, while all other modes of treatment have proved useless, extirpation has radically cured the disease; that, when reproduction takes place, it commonly occurs not in the cicatrix, but in the neighbourhood (a pre-existing nidus probably breaking into activity in the ordinary course of events); and that the operation has been repeated successfully two and three times under the latter peculiarities of regeneration. But there can, on the other hand, be little hesitation in affirming, on the evidence of these occurrences, that such diseases cannot have been primarily carcinomatous. And there is an unquestionable tendency on the part of some writers to exaggerate the frequency of successful issue generally,—an imputation to which Mr. Samuel Cooper, who "recollects more instances in which the operation was followed by a relapse, than a permanent cure,"* is certainly not open.

Enlargement of the inguinal glands has so frequently been known to disappear after the operation by resolution or suppuration, that its existence cannot be considered prohibitory of excision.

SECTION II.

EAR.

EXTERNAL EAR.

§ I. The auricle is sometimes more or less extensively destroyed by cancerous ulceration spreading from the cheek, or even the lip (p. 256); but is a singularly rare seat of primary cancerous disease. Nor do records exist, showing in what manner the affection

* First Lines of Surgery, 7th edit. p. 601. 1840.

originates, when primary in this situation. It is probable that the forms of the disease observed in the skin generally, may appear in the integuments of this part: the proper structure of the auricle is, from its nature, unlikely to form the nidus of cancerous disease.

§ II. The treatment of cancerous ulceration in this situation should be conducted as of that of the skin generally. In a case where the upper third of the auricle was the exclusive seat of an indurated sore, having every character of cancer, Mr. Travers (loc. cit. p. 252) amputated the diseased piece: the wound healed, and, at the time Mr. Travers wrote, he believed the patient remained sound.

INTERNAL EAR.

§ I. Cancerous growths of the dura mater sometimes perforate the pars petrosa, make their way into the internal ear, and even appear at the meatus externus;* but the primary production of carcinoma in this organ is, at the least, singularly rare. Mr. Toynbee informs me, that in the course of his dissections of the ear (nearly nine hundred in number), he has not met with a single case in which he could detect the commencement of scirrhous or encephaloid disease: this statement refers to the internal ear, the meatus externus, and the Eustachian tube.

§ II. Although the primary production of cancer within the internal ear may thus be made matter of doubt; yet cases occur in which, from encroachment of their substance upon that part, cancerous growths give rise to peculiar symptoms and sufferings. These cases may, therefore, be practically considered in connexion with the organ of hearing.

Mr. Travers† gives, as an example of "medullary tumor of the internal ear," the following case: "The sufferings of the patient were severe from the confined situation of the tumor, and the displacement of parts: and the deformity was excessive. Externally the tumor extended from the temporal fossa to the angle of the lower jaw, and internally to the posterior nares and fauces. The mastoid cells were apparently not invaded by the tumor. The jaw became locked, and a bleeding fungus filled the meatus auditorius. The same side of the head and face, and the muscles of deglutition, were paralysed. To this coma succeeded. The patient was nourished with great difficulty; and his death was accelerated

* See p. 513; also an interesting case by Chassaignac, Archives Gén. de Médecine, 2e série, tom. vii. p. 491. Avril, 1835.

† Med. Chir. Trans., vol. xv. p. 252.

by inanition." But as no examination of the body was permitted, that the disease sprang originally from the internal ear, can only be considered matter of conjecture.

An infant, three years old, began to suffer from pain in the right ear, accompanied with fœtid and occasionally bloody discharge from the external meatus, about two months before being visited by Mr. Wishart.* Death occurred, after repeated hæmorrhages, and the usual train of appearances, in less than sixteen weeks after the occurrence of the first symptoms. Among other processes of the morbid growth, was one protruding from the meatus auditorius internus, and lying under the tentorium; the entire of the pars petrosa had disappeared. The facts of the first symptoms being clearly connected with the ear, of the early fungous protrusion from the external meatus, and of the presence of a fungous excrescence jutting forth from the internal meatus, seem to render it highly probable that this growth really took its origin from the internal ear; but that it did not originate under the dura mater covering the pars petrosa, cannot be considered certain.

SECTION III.

EYE.

For the history of cancer of the eye, I must refer the reader to works on Ophthalmology.

Section IV.—Tongue. (See p. 260.)
Section V.—Nose. (See p. 332.)

* Edinb. Med. and Surg. Journal, vol. vii. 1811.

CHAPTER X.

ORGANS OF LOCOMOTION AND APPENDAGES.

SECTION I.

BONES, PERIOSTEUM, AND ENDOSTEUM.*

BONES.

§ I. Cancer presents itself in osseous structure both in the tuberous and infiltrated forms. The tuberiform variety occurs in the cancellated structure of the short and flat, and both in that constituent part and in the central cavity of the long, bones.

The compact substance, according to Cruveilhier, appears, so long as it retains its natural structure, to be insusceptible of becoming the seat of cancerous formation; but the facility of its transmutation into spongy tissue explains the occasional discovery of the morbid matter in the situation of the shell of the bones. This seems to me a somewhat incorrect mode of expressing the fact. The truth is, that the primary morbid change, rarefaction, precedes the formation of cancer in the compact structure of bone; but the notion of transmutation of compact into cancellated structure seems merely fanciful.

§ II. Tuberiform cancer, either primary or secondary in these structures, is most commonly of the latter kind. Such formation appears, when consecutive, to attend cancer of the breast more frequently than carcinoma of other organs. But the preference is by no means exclusive;—witness, among many proofs of this, an interesting example, related by M. Cruveilhier, of cancerous development in the vertebræ and ribs of a subject, who had had a testicle removed for encephaloid disease six months before death. This form of cancer is not attended with hypertrophous development or expansion of the shell of the bones in which it originates; it resembles, on the contrary, the atrophous form of cancer in the soft parts, being commonly accompanied with molecular destruction, or absorption of the osseous tissue.

* I venture to propose the word *endosteum* (formed on the model of endocardium) as a convenient substitute for the phrase "medullary membrane of the bones."

§ III. The shape of these growths is exceedingly various, but appears in the cylindrical bones to be somewhat influenced by the form of their central cavity. They are either of the scirrhous or encephaloid species; in the majority of cases, of the former. The firmness of scirrhus thus situated is ordinarily very considerable; Cruveilhier, with some exaggeration, considers it only distinguishable from fibrous tumor by its furnishing cancerous juice under pressure.

§ IV. Encephaloid is the species most common, when the form of deposition is by infiltration; the hæmatoid variety of this species is not uncommon, and accumulations of blood occur. The infiltrated substance is sometimes (as in a case already spoken of p. 526), more or less abundantly studded with pigment-granules. The infiltration is often so complete, as to remove all appearance of osseous structure from the affected part. The shell of the diseased bone is, with the advance of infiltration, reduced to a lamina of extreme tenuity.

§ V. When carcinoma occurs in the bones (as a mere evidence of the diathesis being established) in a person having primary cancer elsewhere, it rarely, if ever, acquires such magnitude as to cause external tumor; when the osseous tissue is the original nidus of the morbid matter, the case is different, and enlargement, visible externally, may be produced in two distinct ways. 1. The deposition having occupied the entire of the cancellated structure, the investing shell may, as has been mentioned, be destroyed by preparatory rarefaction and subsequent cancerous infiltration,—or absorbed from the pressure of the enclosed mass; in either case the morbid growth escapes under the periosteum, and then rapidly augments in size, while bony spiculæ sprout into its substance from the surface of the adjacent and yet unabsorbed shell. 2. Or the compact tissue may be immensely expanded, and form, as it were, a vast osseous sac, encasing the morbid formation,—in some parts of tolerable thickness; in others, reduced to a mere parchment-like lamina; in others, perforated from absorption: this is one of the diseased conditions to which the term "spina ventosa" has been applied.

§ VI. Whenever expansion of the shell of the affected bone has arisen under the influence of growing cancer, this cancer has (in all cases I have had distinct cognizance of) been of the encephaloid species. I have elsewhere (p. 99) had occasion to mention the opinion of M. Cruveilhier respecting the frequency with which this expansion depends on the presence of colloid cancer; but I have yet to see, or read the description of, a true specimen of this species of

cancer contained within the shell of a bone. The formations which M. Cruveilhier has evidently had in view, are encysted masses and enchondromatous formations. Müller, indeed, dwells upon osseous expansion as one of the conditions distinguishing the progress of enchondroma from all varieties of cancer of bone. But that the latter, when of the encephaloid species, does occasionally produce this effect, would be sufficiently proved (were no other evidence of the fact obtainable) from a preparation [No. 159] in the Museum at St. Bartholomew's, as likewise from the testimony of Sir A. Cooper, Mr. Mayo, and Sir B. Brodie. Mr. Mayo* briefly refers to a case in which the head of the tibia had undergone great expansion, and a doughy elastic tumor appearing on the surface, this had been opened by a surgeon, and about a pound in weight of medullary substance squeezed from it. The following day Mr. Mayo amputated above the knee. "The head of the tibia was found expanded into a thin membranous shell, with very little bony matter in its texture, the cavity being occupied partly with soft yellowish substance resembling the medulla of the brain, partly with coagulum." Sir Benj. Brodie amputated the thigh of a boy aged fourteen, for a tumor eighteen inches in circumference—"this tumor was found to be wholly formed by an expansion of the head of the tibia: its upper and inner part was composed partly of cysts containing a bloody fluid, and partly of organized medullary substance."† Here, however, the cancerous formation was, in all probability, of consecutive growth in the walls of pre-existing cysts; and the practical inference (one of no mean clinical importance) is, that expansion of its shell does not constitute otherwise than a rare phenomenon in the progress of cancer of bone. Such expansion has chiefly been met with in the head of the tibia.

The articular cartilage investing the head of a bone infiltrated with cancer (whether expanded or not) was invariably free, in such cases as I have had an opportunity of examining, from similar infiltration; though frequently in contact with the morbid matter deposited in the bones, the cartilage simply undergoes attenuation and elongation from the traction exercised on it, when expansion of the osseous tissue occurs.

§ VII. The disease may originate simultaneously in the cancellated structure, central cavity, and periosteum of the same bone. It may be limited to a single bone, to a single region of the skeleton, or affect a considerable number of regions in the same individual.

* Outlines of Pathology, p. 53.

† On Dis. of Joints, p. 295, 4th edit. 1836.

The bones of the extremities (especially the tibia, femur, and humerus), the ribs, sternum, vertebræ, clavicle, maxillæ, cranium, and pelvis, are all observed seats of the affection.

PERIOSTEUM.

The periosteum, or, more commonly, the cellular tissue uniting it to the bones, may be the sole seat of cancerous disease. As an example of scirrhus originating in this site, the following case, by M. Cruveilhier, may be related. An inmate of the Salpêtrière, aged about fifty, observed a swelling at the upper part of the sternum two or three years after she had had a cancerous breast removed. It gradually increased to the size of the fist, spread along the right clavicle, and eventually ulcerated in several points; meanwhile tumors, perceptible to the touch, formed in the liver. On post-mortem examination, the internal two-thirds of the clavicle were found very much enlarged, and of fusiform shape: the external third was slender. The tissue of the bone had a healthy aspect, being only corroded superficially, and the morbid formation limited to the periosteum: this membrane "formed a dense firm cylinder, of fibrous tissue, infiltrated with cancerous juice (scirrhus); the corresponding part of the medullary membrane was thickened, and, as it were, infiltrated with serosity." Here were obviously characters of chronic endosteitis.* The sternum was infiltrated with cancerous matter, and the disease had spread thence to the pectoralis major and skin; reversing the more ordinary course of things, in which the affection of the skeleton is consecutive to that of the soft parts.

Periosteal cancer much more commonly exhibits the encephaloid character; and has been described by Sir A. Cooper under the title of "fungous periosteal exostosis." "The swelling," says this distinguished surgeon, "is lobulated; the greater part of it is composed of a white substance, somewhat elastic, but firm, and not so firm as common cartilage [hard encephaloid]; part of it is coloured by blood, and the texture of this part is softer than the rest. When injected, it shows a very unequal vascularity." The periosteum investing the mass is sometimes enormously thickened; and abundant acicular osseous spiculæ disposed in radiating lines, growing more and more delicate, the further they are examined from the surface of the bone, and becoming continuous sometimes, at their

* See art. Endosteitis, Cyclop. of Pract. Surgery, vol. ii.

unattached extremity, with cartilaginiform fibrils, are observed in the substance of the growth.

ENDOSTEUM.

In the majority of cases of cancer of the spongy tissue of the long bones, there is coexisting disease in the lining membrane of their cavity. This fact proves that the endosteum may form the nidus of the diseased formation; and, in all probability, the prolongations of that membrane lining the canals of Havers are its immediate seat of origin in the compact structure. Hence there is some evidence, supported clearly by what is known of the physiology and general pathology of the endosteum, in favour of the opinion that this structure alone gives origin to cancerous substance in bone.

In whatever structure of the bone cancerous disease commences, the only surgical operation which can be of any service is amputation of the limb to which it belongs. "It is unnecessary to say," observes Sir B. Brodie (op. cit. p. 292), "that in all cases of fungus hæmatodes even amputation is of doubtful efficacy." He relates one case in which the patient continued well at the end of more than four years after the operation.

The course of cancerous disease in bone is sometimes very materially modified in its practical relations by its site: illustration of the fact will be found in the section on Cancer of the Cranium, Spine, and Meninges;* and in the upper jaw the characters of the malady are sufficiently peculiar to require separate description. Carcinoma of the upper jaw originates in the interior of the antrum.

ANTRUM.

§ I. Cancerous disease of the antrum is not very uncommon; there are no existing means of ascertaining its exact frequency. It is of more frequent occurrence than any affection causing expansion of the maxillary cavity and deformity of the face, with, perhaps, the single exception of enchondroma.

§ II. Carcinoma of the maxillary sinus may occur as the sole evidence of the diathesis, or in association with other cancers: the

* Chapter VIII. Sections II. and III.

former is the more common case; in other words, the disease is generally primary here, and is but little disposed to contaminate the system by secondary dissemination. Extension of cancer to the antrum from adjacent parts (for instance, the nares, orbit, the alveolar process, and even the hard palate, see p. 264), is occasionally observed.

§ III. Of the production of colloid cancer in this situation I know of no example; scirrhus is very rare: encephaloid is, practically speaking, the cancer of the upper jaw.

§ IV. The morbid production takes its origin from the lining membrane of the sinus. I have not had an opportunity of ever seeing the disease at a period early enough to say in what manner or form of deposition it commences; but, as is the general tendency of cancer connected with mucous structure, the cauliflower shape is soon assumed. The actual extent of connexion of the mass may, even when this has attained large dimensions, continue very limited; a fact exemplified in a remarkable case published by Dr. Warren.*

§ V. Encephaloid disease of the antrum has been observed in both sexes, and at almost all periods of life. It is not unusual for patients to refer its appearance to blows, or other injuries. The extraction of a molar tooth (followed by discharge and swelling) has sometimes been the origin assigned by patients; but, as is observed by Mr. Travers,† the probability is, that the disease had in most cases commenced before the tooth was extracted.

§ VI. The effects produced by the enlargement of a growth in the sinus are as follow. The cheek bulges outwards in the direction of the malar bone and beneath it; a tumor more or less elevated is thus produced; it is firm, resistent, immoveable, and not tender to the touch; the skin may for some time continue free from adhesion. The surface is of dusky reddish colour, or somewhat livid. At an advanced stage, veins of considerable calibre are seen ramifying beneath the skin.

But, while the mass enlarges in the direction of the cheek, it may extend in other aspects, and even make greater progress in some of these than in the former. In consequence of the pressure and expansile force exercised towards the alveoli and arch of the palate, the teeth become loosened, and fall from their sockets; the arch of the palate undergoes depression, until it becomes convex inferiorly, and, in some instances, even presses the tongue forcibly downwards. Or the growth may extend chiefly in the direction of the nares,

* American Edition of art. Cancer, p. 296.

† Med. Chir. Trans., vol. xv. p. 250.

reach the septum, detrude this towards the opposite side, perforate its substance and vegetate within the opposite nostril, having meanwhile made its appearance anteriorly at the external opening of the nares, or advanced by their posterior outlet into the pharynx, or upwards to the ethmoid sinuses. Or, again, the disease may extend mainly towards the lachrymal sac and orbit, producing different effects on the eye and on vision, according as the anterior or posterior parts of the floor of that cavity are chiefly pressed upon.

The symptoms of the disease are (*a.*) mechanical, and (*b.*) vital. (*a.*) A sensation of uneasiness and stuffing in the nostril of the affected side may be the earliest effect of the disease, and may continue its sole symptom for years.* If protrusion occur in the direction of the lachrymal sac, stillicidium lacrymarum becomes a source of much trouble; if the anterior part of the floor of the orbit be pressed upon, diplopia at first, and eventually blindness more or less complete from closure of the eyelids, ensues; if the posterior part of the orbit undergo pressure, the eye is gradually extruded from the orbit, and vision rendered imperfect or destroyed.† When the eyelids, instead of being closed, are kept permanently open, ulceration of the cornea occurs: in Dr. Mackenzie's case, just referred to, a portion of the morbid growth having been removed to allow of their closure in the natural manner, cicatrisation of the ulcer took place within five days. When the palatal arch and pharynx are encroached upon, mastication and deglutition are interfered with: the patient sometimes even dreads to eat, from the fear of being choked in the effort to swallow. Obstruction of the nares impedes, sometimes to a very great amount, the function of breathing. It is important to remember that protrusion may take place at the external orifice of the nostril, long before any remarkable bulging of the cheek has occurred.

(*b.*) *Pain* is not one of the early concomitants of the disease; tumor may have existed for some time before any local discomfort has been experienced. In some instances, a mere sensation of uneasiness has induced the patient to introduce the finger deeply into the nose, when a soft fungous substance has been discovered, and the rude contact led to discharge of blood. But instead of *hæmor-*

* Mackenzie, Diseases of the Eye, p. 71.

† The distance to which the eye may be carried from the socket by the detruding action of morbid growths, without vision being completely destroyed, is most remarkable. In the article Ectopia (Cyclopædia of Surgery, vol. ii. p. 62,) I have quoted a case, in which, although the eye was in this manner brought to the level of the chin, the patient was yet able to distinguish light from darkness.

rhage being brought on for the first time in this manner, it may occur spontaneously, as the earliest symptom; and (as in Dr. Warren's case) reappear frequently before any other evidence of disease arises. In some cases no bleeding occurs, until the molar teeth fall out. However originating, hæmorrhage, at first, almost invariably (and for obvious reasons) gives relief; but its abundance and frequent recurrence soon become seriously alarming.

The *discharge* is abundant and fœtid; pouring into the nares and thence externally, or into the pharynx, into the mouth through the openings left by the disappearance of the teeth, or on the surface of the cheek through ulcerated openings, it is a source of constant torture. Still it is for the advantage of the sufferer that a free passage should be afforded it by one or more of these outlets; as otherwise the evils of distension and compression are much more severely felt.

The *sense of taste* may be early impaired on the affected side of the mouth.

The general symptoms, though occasionally slow in occurring, become eventually severe; diarrhœa and colliquative sweating increase the emaciation, which the pain, the exhaustion from discharge, and the difficulty of swallowing directly induce. Dr. Warren's case shows, that, even after the repeated occurrence of hæmorrhage, the general health may continue unaffected.

§ VII. The statements just made explain the mode in which this disease usually destroys life. Bertrandi* records a case in which the mass is alleged to have proved fatal by causing apoplexy through its pressure on the brain from the orbit. A few months sometimes suffice to bring the disease to its fatal close.

§ VIII. The number of affections of the antrum causing expansion of its cavity and consequent deformity of the face, is far from inconsiderable: with all these affections cancerous disease of the part may by possibility be confounded.

(*a.*) The fluid secreted naturally by the membrane of the antrum, modified more or less in properties, sometimes accumulates to such extent as to cause considerable bulging of the cheek (*dropsy, mucocele, of the sinus*). Dubois† records the case of a boy, who exhibited all the appearances produced by "fungus" of the antrum, detrusion of the eye, great depression of the palate, closure of the nostril, prominence of the cheek, lividity and attenuation of the skin:

* Opérations de Chirurgie, trad. par Sollier, p. 303. 1794. Quoted by Mackenzie.

† Boyer, Maladies Chirurgicales, tom. vi. p. 140.

respiration, sleep, mastication, and speech were interfered with. Sabatier, Pelletan, and Boyer regarded the case as one of "fungus;" an opening made in the attenuated bone behind the upper lip gave issue to a ropy fluid, resembling that of ranula; the cavity (which contained no solid substance) gradually shrank, and seventeen months after, no deformity existed. That men, so experienced as those named, should all four have been deceived, affords sufficient evidence of the difficulty of diagnosis in some of these cases. It is true that, in the instance of this patient, the enlargement had been extremely slow (it had gone on from the age of seven to eighteen), the pain had been but slight, there was no hæmorrhage, and the general health had not suffered. Such collections are most common in young persons, but by no means peculiar to them.*

(*b.*) Accumulations of *pus* in the antrum give rise to precisely the same series of changes as those just referred to; the fluid rarely escapes by the natural opening of the sinus. But they are preceded and accompanied by the usual signs of inflammation; there is much œdema of the soft parts, and caries of the bony walls of the cavity frequently gives spontaneous issue to purulent fluid: through the opening thus formed an examination of the interior of the cavity may generally be made, when the patient seeks advice. Errors of diagnosis have, nevertheless, been committed; and according to the statement of Mr. Liston† the true nature of the disease has sometimes not been detected, until, in the attempt to divide the connexions of the bone for the purpose of effecting its complete removal, the operator has accidentally opened the abscess.

(*c.*) Simple *fibrous tumors* of the antrum are capable of acquiring very large dimensions: originally unattended with pain, they eventually cause suffering by pressure on various parts; they are of globular outline, and of smooth and non-lobulated surface; they enlarge slowly, and they have chiefly occurred in elderly persons.‡

(*d.*) *Enchondroma* of the antrum (benignant osteosarcoma) produces great enlargement, perhaps greater than encephaloid disease even, and the same mechanical effects, as this infinitely more serious

* See Mayo, Outlines of Pathology, p. 277.

† Operative Surgery, 3rd edition, p. 302.

‡ Such, at least, has been the character of those observed in this country. But a tumor of this kind, removed by Mr. O'Shaughnessy (On Diseases of the Jaws, p. 5, Calcutta, 1844), was as large as any of those described by British operators, and yet it was of less than a year's growth: many other instances have occurred in his practice among the Hindoos, showing that rapidity of progress is rather the rule than the exception. All his cases, too, occurred in young persons.

affection: distension and absorption of the bones follow the usual course. But hæmorrhages do not attend its progress; it is the seat of little intrinsic pain; the skin, though greatly attenuated, does not adhere to the diseased parts; nor, if ulceration occur, does protrusion of fungoid growths take place; there is not the fœtid sanguinolent discharge of cancerous disease, nor does the general health suffer as in the latter affection. If these sources of distinction fail, the introduction (which should not be lightly had recourse to) of a probe into the swelling will lead to the discovery, in the instance of enchondroma, of the peculiar crackling and crisp sensation, characteristic of that morbid formation.

(*e.*) *Erectile tumors* of the antrum.—Mr. Pattison records the account of a case, presumed to have been of this kind, cured by ligature of the carotid artery: the growth had expanded the antrum, caused deformity of the face, and detruded the eye; on pressing the mass between two fingers, one placed on the cheek and the other within the mouth, the peculiar pulsation of erectile structure was detected.

(*f.*) True bony *exostosis* sometimes forms in the antrum. An osseous tumor apparently of this origin is contained in the Museum of the Faculty of Paris.* In the Collection of St. Thomas's Hospital is the skull of a woman, who died apoplectic, with an exostosis growing from each antrum.† The symptoms in such cases will probably be merely of the mechanical class. Boyer‡ records a case in which the disease was apparently of venereal origin, and disappeared, after ten years' duration, under an anti-venereal treatment of the patient's own imagining: in less than three months he took one hundred and twenty-eight grains of corrosive sublimate.

Scirrhous may be distinguished from encephaloid disease of the antrum by its slower progress, the greater hardness and less bulk of the tumor, the greater pain attending its enlargement, and the comparative infrequency of severe hæmorrhage.

§ IX. The successful diagnosis of these affections of the antrum is of the highest practical importance. For, while the bold achievements of modern surgery have shown that the removal of the upper jaw, containing enchondromatous or fibrous§ tumors, may be effect-

* Mackenzie on the Eye, 2nd edit. p. 77. 1835.

† Cooper and Travers, Surg. Essays, vol. i. p. 169. 1818.

‡ Maladies Chirurgicales, tom. vi. p. 168. 1818.

§ The evils of leaving behind any portion of bone with which a fibrous tumor has connexion, are forcibly shown in a narrative by M. Cruveilhier (Essai sur l'Anat. Pathol. tom. i. p. 384. 1816). The case is one in which Dupuytren was obliged,

ed, not only with perfect safety, but with much certainty of permanently curing the disease, the proceeding cannot in the case of cancer (as might be expected) lay claim to any such eulogia. Still it is to be remembered that, as before (p. 235) mentioned, there is some ground for believing that extirpation of cancer connected with bone is less invariably unsuccessful than of masses forming in other descriptions of structure. And experience testifies in favour of the operation; if the opportunity be afforded of performing it, at a very early stage of the malady. The language of Mr. Liston,* in speaking of its adviseability, is clear and decisive: "In the *very earliest stages* of this disease, before there is reason to believe that it has extended much backwards, it may perhaps be warrantable to attempt its entire extirpation, and thus afford the patient the only chance of escape from so certain and miserable an end . . . . . I know from experience that this step, if adopted in time, may prove successful; and though at least a doubtful and very severe proceeding, not by any means unattended by danger, it is the only remedy."

JOINTS.

The proper structures of the joints, cartilaginous and synovial, do not, as far as my information goes, ever become the primary, or even isolated, seat of cancerous formation (p. 99). Articular cartilage possesses a remarkable power of resisting the encroachments of cancerous infiltration from adjacent structure.† The cartilage of the head of the tibia may be considerably expanded without undergoing even obvious attenuation; this change, at length occurring, is the prelude to destruction. But accurate observations are wanting upon the mode in which the articular textures become actually carcinomatous (see p. 54); the limb is generally amputated before they have undergone any apparent change of structure: yet the disease in the adjacent bone may have existed for upwards of a year at the time, when the patient submits to the operation.

after two partial attempts at ablation of a growth of the kind in the lower jaw, to remove all the connected parts of the bone. Reproduction was rapid and immediate after the first two operations.

* Operative Surgery, p. 306, 3rd edit. 1840.

† I might have added this to the series of distinctive characters of cancerous and tuberculous disease enumerated in a former place (p. 185). Tuberculous disease of the heads of bones, in truth, frequently extends to the articular structures; and by perforating the cartilages (Univ. Coll. Museum) leads to effusion of softened tubercle into the articular cavity, followed by symptoms of acute synovitis, perfectly assimilable to those of pleuritis consequent on bursting of a pulmonary tubercle into the pleural cavity.

BURSÆ MUCOSÆ.

Practically speaking, cancer of these structures is without interest. It is more than doubtful that they ever become the primary seat of the disease (see p. 99).

SECTION II.

MUSCLES.

Encephaloid tumors originate in the cellular membrane separating the fasciculi of muscular fibres; but they acquire no peculiarity from their situation, and follow the same course as subcutaneous growths.

Dr. Warren (op. cit. p. 66) records an interesting case, in which a tumor of apparently scirrhous structure grew in connexion with the rectus abdominis muscle, the fibres of which had wholly disappeared in the site of the new growth. For the characters of encephaloid infiltration of muscle, I would refer to the case narrated in a previous part of this volume (p. 131); and, for some further brief observations on the subject, to the contents of p. 97.

CHAPTER XI.

CANCER OF ORGANS OF UNKNOWN FUNCTION.

SECTION I.

THYROID GLAND.

§ I. The thyroid gland is very rarely the seat of cancerous disease; nevertheless, cases are recorded in sufficient number to exhibit its characters, both anatomical and symptomatic, under very various conditions. Eight of 8289 deaths from cancer in Paris are ascribed to the thyroid gland, and Herrick and Popp found one example in their 67 post-mortem examinations.

§ II. Cancerous development in the thyroid gland may occur as a primary affection; as a mere evidence of the diathesis; or be the result of extension of the disease from some adjacent part. When primary, the disease may prove fatal, before any other organ becomes implicated; in other words, it continues from first to last solitary: this is so rare, that I know of but one authentic example of the fact, exclusive of alleged cases of cancerous formation in the substance of pre-existing bronchocele. Much more commonly the morbid substance manifests itself in other structures.

If the language of reporters of cases were implicitly trusted to, no doubt could be entertained that the form of the disease, in which cancerous productions spring from pre-existing morbid growths, is the most frequent. It is, in truth, exceedingly common to meet with the statement, that certain portions of cystoid bronchoceles were "truly scirrhous," &c.; but the details given very rarely warrant the application of the term. That, on the other hand, such deposition of scirrhus and also of encephaloid does sometimes occur, preparations exist to prove.*

§ III. Even in cases of the most strongly marked diathesis, the thyroid gland usually escapes. I have examined a very large number of such cases, without finding a single example of its implication. The state of this organ in the subject of Velpeau's *Cas re-*

* Travers, Med. Chir. Trans., loc. cit. vol. xvii.

marquable (p. 40) is consequently very interesting: "The thyroid gland contained about a dozen cancers, all perfectly round, dense, elastic, and of a slightly yellowish-white colour. The section of these presented a blueish tint, and when cut into slices, the transparence, characteristic of scirrhous tissue, became apparent. The largest of them equalled a pigeon's egg in size, the smallest was less than a pea in bulk. All of them were easily separated from the substance of the gland (which was itself perfectly healthy), and were simply in a state of contiguity with it."

§ IV. Encephaloid and scirrhus, simple and of the mastoid, solanoid, and hæmatoid varieties, occur in this organ; I have met with no example of the colloid species developed within it.

When the disease is primary, it most commonly exhibits the characters of scirrhus; the same may be said of cancerous formations occurring in connexion with pre-existing cystoid growths When, on the contrary, the thyroid gland suffers secondarily, or coetaneously with various other organs, it almost invariably becomes the seat of some variety of encephaloid; I say almost invariably, for Velpeau's case supplies, at least, one instance of the production of scirrhus under such circumstances.

§ V. When primary, the disease is usually of the infiltrated form; when secondary, of the tuberous. When the disease consists in infiltration, one spot only, be this of limited or considerable extent, is commonly affected; when tuberous, one or several nodules may be present.

§ VI. The disease may affect the entire gland, or be confined to one of its lobes: the latter is the more common case.

§ VII. The presence of cancerous nodules in the thyroid gland does not cause any textural change in the non-cancerous parts. Even when the gland has been almost totally destroyed by infiltration, the remaining portion may be perfectly natural, as is proved by Mr. C. Hawkins's case* among others.

§ VIII. The mass produced by infiltrated cancer of the gland may acquire considerable bulk, and reach from the upper level of the larynx to the sternum, while it extends posteriorly on either side to the œsophagus.

§ IX. If one lobe of the gland be alone affected, or be much more enlarged than its fellow, the larynx, or the trachea, is detruded to the opposite side; this detrusion may be to such an amount, as to give that tube a curved form. To this rule an exception will occur where (as in Mr. Brown's case) enlargement of the lymphatic

* Med. Chirurg. Transactions, vol. xxvii. 1844.

glands, and adhesions of adjacent textures, fix the larynx firmly in its natural position.

The carotid, internal jugular vein, and vagus nerve, may be separated from each other by the growing mass; the vein also perforated by a process issuing from its substance, and the fibrils of the nerves stretched and expanded.

The calibre of the œsophagus may be considerably diminished by the pressure of the morbid mass, independently of actual disease of its own walls.

§ X. In the tuberous form the disease displays little or no tendency to encroach upon neighbouring parts; in the infiltrated form (whether the infiltration have originated in the proper substance of the gland or not) such tendency is invariably observed, and in its consequences commonly proves destructive of life.

§ XI. Primary cancer of the thyroid gland is thus prone to spread to the œsophagus and trachea by continuity of substance. The unconnected structures which suffer secondarily are, as experience shows, the lymphatic glands, the skin (Mr. Brown's case* supplies a most interesting example of the development of cancerous nodules of the integuments), the lungs, and the liver.

§ XII. Ulceration is more slow to occur on the anterior or cutaneous surface of the tumor than in its more deeply-seated parts. Thus, destruction, and fungous protrusion into the interior of the œsophagus took place, in Mr. Hawkins's case, before any such change arose in the integuments; the skin indeed appears to have remained unattached and unaltered in colour to the last. The larynx and trachea, though nearer the morbid formation, are less prone to suffer than the œsophagus. Perforation of the trachea at its posterior aspect sometimes occurs. Thickening of the epiglottis has been observed, unconnected with implication of the trachea.

§ XIII. Concerning special causes, nothing can be said. Of five cases, three were supplied by females; two by males. The mean age of these five persons was 48·4 years: the extremes, 60 years and 35 years. I have included here only such cases as were manifestly examples of primary disease of the gland.

§ XIV. Where the disease is limited to the thyroid gland, and does not encroach on the adjacent important tubes, life may continue, in spite of the existence even of scirrho-encephaloid, for a considerable number of years. Under the contrary circumstances, a few months, or, as in Mr. Hawkins's case, a few weeks (the total duration of the malady, from the first occurrence of symptoms at

* Medico-Chirurg. Transactions, vol. xxvii. 1844.

least, was here but fourteen weeks) suffice to cut off the patient. There is not a sufficient number of cases on record to furnish any correct inference as to the average duration of the disease.

§ XV. The tumor may, or may not, be smooth; its consistence varies with the species of cancer, but is generally considerable, and has in some instances been extreme. Like an ordinary bronchocele, the mass moves with the larynx, unless adhesions have formed, binding it closely to other parts. But it is to be observed, that the motions of the larynx itself are less free in cases of cancerous, than of other, enlargements of the gland. The skin, as has been seen, may exhibit the natural appearance; the veins in the neighbourhood are commonly full.

No functional disturbances dependent on the organ itself arise from the existence of this disease; this was of course to be expected. Pain and tenderness under pressure are uncommon; Mr. Hawkins's case shows they may be completely absent, until an advanced period; and here they probably rather depended on the œsophageal disease than on the original tumor. The earliest uneasiness is referred to the larynx and œsophagus, rather than to the seat of the primary cancerous formation.

The symptoms produced by pressure on the neighbouring parts are obstructive and irritative. Thus, uneasy sensations in the larynx; hoarseness; stridulous respiration; dyspnœa (sometimes convulsive) relieved in some instances by the erect posture; weakness of voice, eventually aphonia; cough at first slight, subsequently becoming violent and convulsive, and attended with abundant mucopurulent expectoration (streaked in some cases with blood); dysphagia increasing gradually in amount, occurring spasmodically, and eventually growing so severe that deglutition becomes impossible,—are all symptoms, which have been witnessed independently of destruction by ulceration, or otherwise, of the œsophagus or trachea. When blood is vomited, a difficulty may arise in determining whether this had been furnished by an ulcerated surface of the œsophagus and rejected after having been swallowed, or supplied by an exposed cancerous surface in the stomach itself. This difficulty actually arose in Mr. Hawkins's case, and was increased by the circumstances that vomiting of food had occurred for some time before the hæmatemesis, and that pain and tenderness in the epigastrium were complained of more than any other symptom. The stomach was nevertheless perfectly healthy; and this absence of disease furnishes presumptive evidence, though not proof, that the blood came originally from the œsophagus; while the epigastric

pain is plausibly explicable, as Mr. Hawkins observes, by the distension of the vagus nerves. I would refer the reader to some observations I have already made (p. 292) upon a somewhat analogous point.

The general symptoms, at first scarcely noticeable, eventually become severe; the patient commonly dies in a state of extreme emaciation; but this is as much, or more, the result of physical obstruction to deglutition, as of the constitutional influence of the disease.

§ XVI. The *seat* of cancer of the thyroid gland (and, in settling this question, we infer the non-aneurismal nature of the tumor) is to be determined in the same manner as that of common bronchocele; it is consequently not necessary to dwell here upon the point.

But the *nature* of the mass is less easily ascertainable than its seat. It is true that when local lancinating pain, change in the colour of the skin generally, emaciation, and distressed expression of countenance exist in a person having a tumor in the thyroid gland, the diagnosis does not present any serious difficulty: but it is to be remembered that all these aids may be wanting to the observer.

The direct diagnosis must then be founded on the solidity of the tumor, on its deficiency in moveableness, and uniformity of consistence (unless softening of encephaloid have occurred) in all its parts; the mass does not exhibit that regularity of form, which usually distinguishes ordinary bronchocele; it is rarely lobulated, and, if so, the lobes are much less distinct than those of the latter tumor. The inference derivable from these characters will be confirmed, if the age of the individual be upwards of forty; and rendered almost certain, if cancerous tumors exist in other parts of the frame.

The disease may in cases of doubt be distinguished from encysted bronchocele by puncture with the grooved needle; the peculiar crackling sensation furnished by cartilaginiform or enchondromatous tumors will also be wanting, when the instrument is introduced.

It may be admitted, with Bayle, that there can be no possibility of ascertaining with certainty, during the life of the patient, whether a bronchocele, perfectly free from pain, does, or does not, contain some portions of scirrhus or encephaloid; however, the existence or non-existence of these morbid products in other organs will afford a presumption in favour of, or against, their existence in the thyroid gland.

§ XVII. The external application of the ioduret of lead ointment and the internal use of the ioduret of arsenic are the only medicinal

means which appear to me worthy of trial with the view of arresting the progress of the disease.

The situation of the tumor renders it almost unfit for compression.

The removal of bronchoceles, some part of which had begun to assume the characters of scirrhus, has been successfully accomplished. Dr. Warren (on Tumors, p. 304) describes an operation of the kind performed by himself; the patient (a woman aged forty-five) left the hospital in about a month after the tumor had been cut out, but of her subsequent history I find no account. She suffered in the afternoon of the day of operation from sinking, and subsequently pain, at the epigastrium, which may very probably have been caused by irritation of the vagus nerve.

The dangers attending the extirpation of the thyroid gland, merely considered as a surgical operation, are almost proverbial; it seems difficult to conceive the attempt to remove the organ, when affected with cancerous disease, in anywise warrantable.

SECTION II.

THYMUS GLAND.

The language of some of the older writers would lead to the supposition that carcinoma of the thymus is far from uncommon. Haller* affirms that this organ "frequently becomes enlarged and affected with scirrhus, along with the conglobate glands;" that it "passes into a state of scirrhus, as he and others have seen."† Haugsted‡ justly concludes, that, where no description is given of the affected parts, the accuracy of such phrases may be questioned: it is more than probable, indeed, that Haller simply meant to describe induration in using the term. Lieutaud§ is sometimes more precise in his description of the "scirrhous thymus;" but in these instances the affection appears to have really been of tuberculous character. The characters of cancer of this organ—for though beyond doubt it can rarely, judging from the deficiency of modern observations on the subject, be the seat of the disease, yet there is no reason to suppose it exempt from it—remain to be investigated.

Spleen.—See p. 312.
Supra-renal Capsules.—See p. 394.

* Opusc. Pathol., Obs. 45. Eng. Transl., p. 147. 1756.

† El. Physiol., tom. iii. p. 119.

‡ Thymi in Homine ac per seriem Animalium, Descript. Anat. Pathol. et Physiol., Icon. 34 illustrat. Hafniæ, 1832.

§ Hist. Anat. Med., tom. ii. pp. 118, 851, Obs. 761, 763.

CHAPTER XII.

CANCER OF THE SUBCUTANEOUS CELLULAR TISSUE.

§ I. The subcutaneous cellular tissue of the trunk and extremities is one of the most common seats of encephaloid; but is rarely observed to give primary origin to scirrhus: colloid cancer does not appear to form in this structure. What has been said respecting the mode of growth, symptoms, termination, and treatment of encephaloid tumors generally, is perfectly applicable to the disease in this situation. It will therefore be only necessary here briefly to recapitulate their characters.

§ II. For practical purposes it may be well to consider the progress of the diseased formation as divisible into three stages, which correspond with developmental changes in its substance. 1. The tumor varies in size when first detected by the patient, sometimes not exceeding, at this period, that of a pea or of a marble; in other instances attaining much greater bulk, before it excites attention. At this stage, though firm, it possesses a certain share of elasticity; it is moveable, rather distinctly circumscribed, smooth and even on its surface, and of equal firmness in every part of its extent; the investing skin presents its natural thickness, suppleness, and elasticity; little, if any, pain is complained of; the patient is sometimes even unconscious of the existence of the foreign growth, which may also be handled firmly without exciting uneasiness. 2. After a variable time the tumor begins to increase in size in a marked manner, and sometimes with extraordinary rapidity; it loses its smooth and even surface, becomes irregularly lobulated, exhibiting in some parts considerable projection almost amounting to *pointing*, accompanied with a softness which conveys a sensation resembling that of fluctuation; while in other parts this is much less marked, and elsewhere the original firmness of the growth is still preserved. The skin, still moveable on the surface of the tumor (which itself grows immoveable from spreading among the muscles and subjacent parts), becomes evidently attenuated, in some cases to such a degree as to resemble mere cuticle, while it assumes a livid or yellowish-red colour, especially at the most prominent parts; the superficial veins enlarge. Severe pain, frequently of the lanci-

nating kind, is frequently felt at this period, and the part is often exceedingly tender to the touch. Sometimes increase of temperature is observed on the surface, but this is to be taken as evidence probably of a sub-inflammatory state of the integuments. 3. The skin at length gives way at one or more prominent points, a thin serous fluid with more or less blood exudes from the openings, and fungous masses spring from these within a brief period—it may be a few hours—after perforation; the destruction of the skin advances, and the phenomena which have led to the invention of the term fungus hæmatodes proceed in the manner already described.

It is important to remember that pain may be the first symptom; the patient is sometimes led to seek advice for this, before the least swelling is to be detected, in a situation where an encephaloid growth afterwards advances with rapidity.* The discovery of the tumor may, or may not, have been preceded by an impaired state of the general health.

§ III. The characters of encephaloid growths during the two latter stages are marked and peculiar. During the third an error of diagnosis is with ordinary attention impossible; and during the second, unless some peculiar circumstances combine to mislead the observer, it is difficult to mistake the nature of the tumor. During the first, however,—and the characters attributed to this may exist for some time after the new formation has acquired considerable bulk,—no small difficulty is sometimes experienced in deciding on its nature: if the disease give rise to no constitutional suffering, this difficulty may be insurmountable, until the ulterior progress of the growth shall have been watched; a fact which proves the necessity of caution in the prognosis of incipient tumors.

The *nature* of the tumor being ascertained, its limits and original seat require to be made out. Careful examination both of the growth itself and of the adjoining vessels and nerves is essential for this purpose; the commemorative symptoms, also, will throw light on its original site, and this in turn clear up the question of its existing relations. If the disease originate under a fascia, there is more than ordinary density and resistance. Encephaloid cancer, springing from the substance of the bones of a limb, "begins in general enlargement of that limb in the part opposite to the seat of the complaint, and to a considerable extent around it:" if the mass grow from the subperiosteal cellular membrane, "the general

* See a case in Travers, op. cit. vol. xvii. p. 394.

swelling of the limb is less, and the particular tumor more prominent," than when it has a truly osseous origin.*

§ IV. If the growth be situated in such manner as to admit of being completely excised along with a thick layer of sound tissue, this may be done; if not, the limb affected may be amputated: if seated where there is a doubt respecting its limits (as is often the case in the neck), and where amputation is inapplicable, instrumental interference of any kind with the disease will only hasten the patient's destruction. And it is to be remembered, that even the sacrifice of a limb by no means absolves the sufferer from destruction by local reproduction of the disease, or by the active progress of internal cancers: nay more, that death has occasionally been hastened by such operations—complete though they be in nature and intent—is a fact of which experience has fully demonstrated the sad reality.

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§ I. The subcutaneous cellular membrane, which thus becomes the occasional seat of isolated cancerous tumors, running the ordinary course of such growths, much more rarely gives origin to the disease in another and very peculiar form. In this tissue appear numbers of nodular masses, of limited dimensions, scattered over the trunk, extremities, and face, and possessing in a more or less distinct manner the characters of some variety of carcinoma. The similarity, in point of outward character, of these nodules to secondary growths in the liver, lungs, and viscera generally, is particularly striking: but the history of these products shows that in this locality the form referred to may appertain to *primary* developments.

§ II. These subcutaneous nodules may be the sole evidence of cancerous diathesis, or coexist with visceral formations of the same kind. In nine of thirteen cases similar cancerous formations had occurred in other structures, in six of seven cases preceding the appearance of the subcutaneous nodules.

§ III. In the great majority of cases the structure of the nodules has been encephaloid in the true cerebriform or in the creamy state: they are in some cases described as of firm consistence; and it has been affirmed that they are sometimes actually scirrhous. In a remarkable case recorded by Cruveilhier they were abundantly infiltrated with melanic matter, and exhibited all the varieties of

* A. Cooper, Surg. Essays, Part i. p. 194.

hue caused by the presence of that matter in various proportions. Otherwise their internal colour varied (as that of encephaloid generally), being whitish, pinkish, or yellowish.

In form they are more or less globular; in rare instances exhibiting some tendency to imperfect pedunculation. They occur solitarily or aggregated in numbers; and vary in size from that of a pin's head to a chesnut.

Under the microscope, Mr. Ancell found their structure "obscurely cellular, in the mass;" and containing distinct, nearly circular, nucleated cells, resembling those of encephaloid.

§ IV. In thirteen cases, analysed by Mr. Dorrington, the tumors were seated on the head, neck, trunk, and extremities in two; on the neck, trunk, and extremities in three; on the head and trunk in one; on the neck and extremities in two; on the trunk only in four.

§ V. In about half of recorded cases the colour of the skin has remained unaffected upon, and in the neighbourhood of, these nodules. Different forms of violet, blackish, or purplish discoloration have been noticed in others, obviously depending on infiltration of blood. From the case narrated further on, the characters of these discolorations may be fully learned.

The production of these nodules continues, in the ordinary class of cases, more or less steadily, over different parts of the surface, from the first appearance of the disease till its fatal close.

§ VI. The anatomical progress of these nodules has been very imperfectly watched and described. In few instances is anything said upon the subject by narrators of cases; their silence probably justifies the belief that changes are slow to occur. In a case recorded by Mr. Dorrington, some of the tumors disappeared spontaneously, a dark ecchymosis (which went through the ordinary changes of tint) only remaining in the spot they had occupied. Others, occasionally, became blueish or livid, the skin gave way, and a few drops of blood escaped, concreting into a dry clot on the skin. Softening has been noted in a certain number of instances. And it would apparently follow, from Mr. Ancell's case, that after removal the reproduced growth may be considerably harder than that to which it has succeeded.

In the University College Museum are preserved models and specimens of subcutaneous and cutaneous carcinomatous nodules formed in the thigh and other parts of the body of a female, who had been under the care of Dr. A. T. Thomson. The following particulars are, with his permission, condensed from the Hospital-books.

M. B., widow, ætat. 42, admitted June 8th, 1840.—In November last was quite well: at that time had a severe cold from a wetting; left leg below the knee became swollen and hot, but not very painful. About a week later (the leg having meantime got well), she had an attack of rather severe gastro-enteritis (abdominal pain, vomiting, purging, &c.) At this period she noticed one or two dark-coloured brownish spots in the skin of the left leg and thigh, and right arm and shoulder (as if of effused blood), unattended with elevation of the cutis. Shortly afterwards, a hard tumor appeared in the skin: this, she says, had at first exactly the characters of another tumor, which having appeared about five years previously at the top of the sternum, about the size of a pea, red, but not hard, remained some time, and completely disappeared, without breaking up, under the action of a plaster (mercurial?). The tumor discovered in November gradually increased in size, eventually looking like a "dried date;" it broke, and discharged a darkish, fœtid matter like "woollen cotton," on the application of a poultice. In the course of six weeks the abdominal symptoms disappeared; but the morbid state of the skin continued. Close to the first, a second tumor of similar kind formed. Besides, a number of nodules, of much smaller size and redder, sprouted up in the neighbourhood; became painful, hot, and smarting; broke, and discharged a thin, blackish fœtid fluid, leaving superficial ulcers: the larger tumors left much deeper ulcers. After this cutaneous affection appeared, she felt well in general health. . . . . .

June 8. *Present state.*—Emaciation; sallow yellowish tinge of skin; drowsiness, yet insomnia; no headache. On the thigh are three principal unhealthy-looking ulcers with irregular inverted edges, furnishing offensive puriform discharge: around them are a considerable number of slightly red, nearly globular tumors, some of them standing out upwards of an inch from the skin. They are soft, and many of the larger ones eroded on the surface; they are not tender to the touch; the ulcers are very tender and painful at times, generally after exercise of the limb; the pain is of burning, smarting character. No spot, that has ulcerated, has (she alleges) ever healed; and, with the exception of the single one on the sternum, all the tumors have undergone ulceration; the blotches have not disappeared, unless where the skin has been totally destroyed. On the left arm, and below the left eye, are two small hard lumps, seated apparently under the skin. The left inguinal glands are enlarged and hard, but not painful.

Numerous lumps appeared during the patient's sojourn in the hospital. It was ascertained, that, when they first appeared, they were very small, white, hard, and moveable under the skin; after a time they became red, softened, suppurated, and ran several into each other, so as to form a single large ulcer. Or, instead of suppurating, some few, after reaching the stage of redness, became constricted at the base, and then fell off in the poultice; such places then cicatrised. Others appeared not to reach the stage of redness; but, after existing in the hard state, to undergo absorption, no trace of their presence remaining. A few others, having become red, gradually died away, leaving a reddened patch without any elevation of the part.

It is unnecessary to follow the details of the case day by day, as nothing novel occurred in the characters of the cutaneous affection: similar formations appeared on the forehead. The tumor under the eye was excised, and the separation of three of those on the thigh hastened by ligature. In spite of various and active local and general treatment, the woman gradually sank in a cachectic state; her death (which took place on the 21st July) being accelerated by profuse diarrhœa.

The catamenia, which had not appeared for three years (since her husband's death), are said to have been present two or three days before her decease.

Post-mortem examination (18 hours after death).—The tumors of the *skin* are some of them pale, and of fibrous consistence; others are of dark red colour, and vascular; some of them are seated in the skin, others in the subcutaneous cellular membrane; the muscles are not involved.—*Inguinal and iliac glands* enlarged, and of precisely similar structure. The external surface of the *liver* (which is somewhat large) is dotted with white points about the size of a millet-seed. The substance of the organ, pale and firm, contains white points of the same description.—Nothing of the kind existed in the *lungs;* here were appearances of lobular pneumonia.—The body of the *uterus* contained a small serous cyst; and, at the right side of the fundus, a mass of pale, semi-cartilaginous substance, similar in structure to the cutaneous tumors.—The swellings on the *forehead* are of the same character; they appeared connected with the periosteum; the subjacent bone is full of holes. —The *mesenteric glands* are somewhat enlarged by deposit of the kind already described.—The *kidneys* were affected with granular disease.—Some other less important morbid states existed, unconnected, to all appearance, with the main affection.

The structure of the nodules (preserved in the Museum) is encephaloid; tuberous or infiltrated. Infiltration of the cutis is obvious in one of the specimens; but, as a general fact, implication of the skin seems to have been secondary (as follows, too, from the above account of the manner in which the growths formed) to formation in the subcutaneous cellular membrane. No cause could be discovered for the disease.

§ VII. The lymphatic glands appear to be less frequently affected than is usual; at least, they are not often said to have been implicated. In other respects the progress of cancerous dissemination seems to have been of the usual stamp; the lungs have been more frequently the seat of nodular formations than the liver. In Mr. Dorrington's patient, both the cerebrum and cerebellum presented appearances traceable to their presence. The case just related is rendered very peculiar by the implication of the uterus.

Independently of cancerous disease, morbid alterations of very various characters have been noted in these cases; but none of them apparently dependant on the subcutaneous affection.

§ VIII. The disease has been observed at all ages after puberty (seventeen and sixty-two years being the extremes), and in individuals of all temperaments; has occurred in both sexes, and with slightly greater frequency in females than in males, and in persons belonging to varieties of trade and social position. No direct or exciting cause of its development has yet been discovered. In the remarkable narrative by Mr. Ancell, it is mentioned that the patient's grandmother was affected with similar growths on the

head, her mother had a large one in the same locality, one of her sisters had a tumor extirpated from the breast, and another sister had a large crop of tumors on the head, forehead, temples, and about the ears: several children of the latter, including two sons, are similarly affected. In no instance could Mr. Ancell discover the disease to have been transmitted by the males of the family; the female members are remarkable also for their prolificness.

§ IX. The mean duration of the disease after the appearance of the subcutaneous tumors was, in eight cases analysed by Mr. Dorrington, 22·62 weeks; the extremes, 8 and 66 weeks. But some of the tumors, in the female observed by Mr. Ancell, had existed for forty years; in the case above recorded, upwards of five years and a half elapsed between the appearance of the first nodule and the woman's death.

§ X. Wandering pains, mistaken sometimes for those of rheumatism, preceded the appearance of the nodules in a fair number of cases. In five of eleven cases, the appearance of the subcutaneous nodules was preceded by that of other tumors; and, in four of these five, Mr. Dorrington finds these tumors were seated in glandular structures.

Of local symptoms there can be said to be none. With the exception of the case just transcribed, *pain* seems to be mentioned in but two instances. In the case recorded by Abernethy, it was evidently not acute. The tumors observed by Mr. Ancell sometimes itched; considerable pain was excited by pinching them, and they were said by the patient to "shoot and leap a good deal before rain:" otherwise, they were free from uneasiness.

The general health may for a certain time continue perfectly unaffected; but eventually constitutional symptoms set in. The appetite fails; emaciation and straw-coloured discoloration of the skin follow, and the strength and vital powers rapidly decline.

§ XI. Generally speaking, death is the result of the general constitutional suffering and impaired nutrition entailed by the disease; in one case only does it appear to have been caused by the local progress of a cancerous sore. The fatal issue has sometimes been accelerated by profuse diarrhœa.

§ XII. One of the names which have been given to this form of carcinoma (*mollusciform cancer*) has reference to the only disease with which it may by possibility be confounded: I mean molluscum. In such a case as that above recorded, no such error could arise; whereas, on the other hand, there are others (and that nar-

rated by Mr. Ancell is among the number) in which the distinction seems next to impossible. All that can be said upon the subject, perhaps, is, that in molluscum pedunculation exists, while carcinomatous nodules are completely, or almost completely, sessile: evidence may exist in the cancerous affection of implication of internal organs, or of the lymphatic glands, and will be absent in molluscum: the tumors in cancer continue to form after their first appearance; this is not the case in the other disease: a cancerous taint may exist in the family of the individual with carcinoma: and finally, the general health eventually surely fails in the cancerous affection. Should ulceration occur, the diagnosis will lose its difficulty. A cautious prognosis should be given.

§ XIII. The influence of arsenic over affections of the skin in general gives it a special claim to trial in instances of cutaneous cancer. And in a case recorded by Dr. Thomson, a number of nodules, the seats of lancinating pain, and to all appearance of the nature described in this section, disappeared almost completely in the course of two months and a half under the use of the iodide of arsenic. Even in the fatal case, of which the particulars are inserted in a previous page, the progress of the disease appears to have undergone temporary control under the use of the same salt.

Several tumors had been removed some years previously by Mr. Bryant from the scalp of the patient whose history is related by Mr. Ancell. Some were incised, and the contents "turned out;" others removed by ligature. The scalp healed in a few weeks, and the tumors were all reproduced within twelve months. When Mr. Ancell saw the woman, the evidence, that many of the existing nodules had sprouted from under the cicatrised skin, was, as he observes, conclusive; for they were compressed, flattened, and marked on the surface by cicatrices.

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APPENDIX.

(A.) See pages 360—362.

I AM indebted to the courtesy of Dr. Donnelly, of Sandgate, (under whose care the patient placed himself on his return home,) for the following particulars of the sequel of the case of mediastinal tumor related at p. 360. The patient survived till the 11th of October; his dyspnœa and paroxysmal cough increased in severity, and œdema of the greater part of the thorax, neck, and head, supervened before his death; otherwise no new feature marked the progress of the affection. "A carcinomatous tumor, weighing about eight pounds, filled nearly the entire thoracic cavity, from the top of the sternum to the ensiform cartilage,—occupying the whole of the right side from the sternum to the vertebræ, and the upper part of the left, as low down as the sixth rib.—The *right lung* (4 lines thick, 1½ inches broad, and 3½ inches long) lay along the spine: it was perfectly sound, and free from morbid deposit of any kind.—The *left lung*, firmly adherent to the six upper ribs, compressed backwards and downwards, was the seat of venous congestion, but otherwise healthy. The *heart*, pushed behind the tumor in the left side, was empty; the parietes of all the cavities (especially of the left ventricle) thin; no valvular or structural disease.—The *liver* healthy.

"The tumor, taken *en masse*, was solid and resisting; but gave way in the attempt to separate its costal adhesions. The lacerated parts strongly resembled broken-up cerebral substance. The whole growth deprived of a fibrous covering, which invested it, seemed a congeries of minor tumors, its component lobes. Firm in some places, these lobes were in others soft, homogeneous, and cream-coloured. Behind the lower part of the sternum, a dark, brownish matter of the consistence of molasses, escaped from the tumor, gelatinous, tenacious, and, like the substance of the growth generally, disposed to adhere to the hands. The right inferior part of the mass consisted of several cysts (one of them larger than a hen's egg) filled with a gelatinous, clear fluid." A portion of the tumor, which Dr. Donnelly transmitted to me, was composed of fatty substance.

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