STRAY LEAVES, AND SOME FRUIT ON CANCER AND TUBERCULOSIS: BASED UPON PHYSIOLOGIC CHEMICAL PRINCIPLES BEING A THESIS IN TWO PARTS

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Stray Leaves, and Some Fruit

ON

Cancer and Tuberculosis

Based upon physiologic chemical principles

BEING A

Thesis in Two Parts

(Illustrated with Diagrams and Chart)

BY

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"In omnibus tribulationem patimur, sed non angustiamur.
Aporiamur, sed non destitutimur." . . . . "Credidi propter quod locutus sum."

PART I.

On the rôle of the Leucocyte in the natural production of specific vaccines in Cancer, Tuberculosis and other INFECTIONS, and their bearing on METASTASIS.

NOTWITHSTANDING the fact that hardly a single morbid condition is met with in which the lymphatic system and its glands are not more or less involved, the present-day practitioner cannot but be impressed with the singular lack of knowledge concerning the anatomical evolution or the physiological functions of the lymphatic systems and of the glands belonging to these systems. The nature of their action seems to have been so little understood, that they have been usually regarded as "the weak spots" in the anatomy of the organism. "The physician or surgeon is apt to under-estimate the power of resistance of lymphatic glands, because, in the nature of things, he is a witness only of their lost battles; those which they win remain unknown. That the victories are more frequent than we are in the habit of realizing is well illustrated by some observations of Manfredi."[1] Nevertheless when these systems have once been reached by the micro-organisms of a bacterial infection, they are supposed to find in them congenial soil. Eminent bacteriologists have spoken of the micro-organisms as "entrenching themselves with spindle cells" in the sub-mucous connective tissues; "and again such organisms on entering a cell might stimulate it to division, at the same time frequently dividing themselves, so that in each daughter cell would be a small colony of the micro-organisms." These glands are further supposed to provide for the subsequent proliferation of organisms, and a "nidus" or "focus" for the spreading of the infection; and this is said to be effected by way of the lymphatic ducts and channels.

The stages of swelling, degeneration, suppuration and caseation, that these glands are known to pass through, have tended to confirm this belief; and their extirpation, along with their adnexæ, has been therefore considered essential by the surgeon, before complete recovery from the disease can be hoped for.

Their dissection necessarily becomes a very lengthy, elaborate, and

1 Encyclo. Medica.

as a rule, incomplete procedure. Owing to the apparent unsymmetrical, intricate, and delicate inter-relationship of these glands with one another, and with the intercellular spaces in various parts of the body, which have never been, and are never likely to be, mapped out with sufficient anatomical precision, accurate surgical procedure is impossible. A complete extirpation of these structures, to include the "causa causans" and, at the same time, a certain wide margin of healthy tissue, can only, therefore, be conscientiously hoped for (as in cancer) at such an early stage of the disease that the individual concerned is hardly aware of any evidence of its presence. In ninety-nine cases out of a hundred what happens is, that medical attention is sought when, pathologically speaking, the disease is more extensive than appears to the naked eye of the patient, or the microscopically aided eye of the bacteriologist. Unfortunately, we have no means at hand for bringing the microscope to bear on the diseased site in the living tissues, until a portion of the suspected tissue is placed on the stage of the microscope; and, even then, unless the particular micro-organism can be detected and identified, it is difficult to conclude with certainty, where the physiological phenomena end and the pathological phenomena begin. For obvious reasons it is impossible to estimate either the epoch at which the stimuli producing the condition first occur, or the precise nature of the exciting cause. Profound changes are likely to have ensued at two points at least, namely, at the site of the stimulus on the one hand, and in the nearest correlated lymphatic gland on the other. In this reference the remarks of Dr. Mitchell Stevens are very suggestive, accounting for what he has well termed the "latent period."[2] The timely extirpation with the knife of the entire tissues, within a certain radius, is doubtless a perfect operation, with a perfect result. But, as has been stated, it is the great exception for the surgeon to opportunely meet with and diagnose such a case with certainty; and, in consequence of imperfect physiological reactions *in situ*, the disease becomes established, and extends in different directions; from these it is not possible to eradicate it with any certainty by a single operation or even by repeated surgical procedures. The resulting disease is now looked upon as a foreign monstrosity; hence the medieval terms Cancer, Lupus, etc. An eminent surgeon has recently gone so far as to attribute to the former of these diseases definite vascular organs. As he says:—"It is obvious that a living organism such as a cancer is, must conform to physiological rules, and that its products must escape by its veins or by its lymphatics."[3]

The questions arise:—

(1). What is the origin and the rôle of the lymphatic systems in infections?

2 British Medical Journal. 9th Feb., 1907.
3 British Medical Journal. Jan. 27th, 1906. P. 182.

(2). Where do the leucocytes which are concerned in a leucocytosis come from, in response to these unwonted stimuli ?

(3). If they perform phagocytosis, what becomes of the satiated phagocytes and their contents ?

(4). What becomes of those that are surfeited ? and

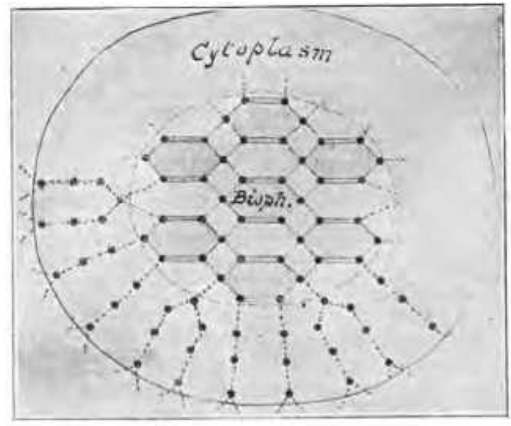
(5). What is the ultimate aim and object of phagocytosis ?

I will endeavour to answer these questions hypothetically but categorically. I must therefore beg the indulgence of my readers. But, before doing so, a few remarks on the origin and the anatomy of these lymphatic glands may not be out of place.

FIG. 1.—(a) Human leucocyte, anatomically mature and normal, showing details of structure previous to Mitosis. For stereoscopic effect, view through pin-hole in thin card.

The earliest indications of the lymphatic system that we have may be seen in the cytoplasm of the mature leucocyte itself. This is evidenced by the filamental reticulum which first appears in the peripheral parts of the cell, converging by irregular centripetal lines towards the nucleus, they permit of a flow of fluid from the periphery to the nuclear membrane, beyond which they do not penetrate, to suit the cell to its especial environment by adaptation.

These filamental channels become re-inforced later on by what are known as plasmosomes or zymogen granules. These are distributed un-symmetrically throughout the cytoplasm of the cell, but paravascu-



(b) Diagram of leucocyte (after Adami) illustrating 'skeletal' structure in regard to nuclear and cytoplasmic parts. Where nucleus represents germinatival and controlling centre and cytoplasm represents sensory, motor, circulatory, alimentative, digestive and excretory mechanisms.

larly to these channels, in their bifurcations or angles. These granules Professor Adami has indicated as originating from the nucleus itself. Their function is to produce the cell enzyme or cytase, which has been described as an extremely complex nucleo-proteid substance. These channels and plasmosomes represent respectively the lymphatic vessels and glands; and it is possible that Mr. Lockwood had them in mind when he spoke of the veins and lymphatics of the living organism of cancer.

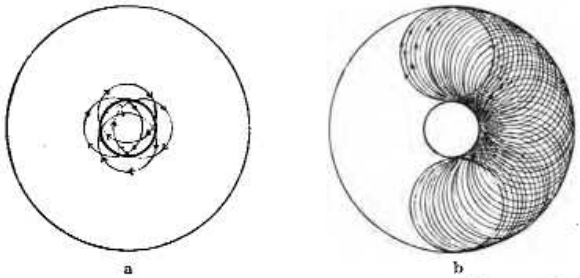


FIG. 2.—Illustrating leucocytic function. Metabolism. Repulsion to like bodies and affinity for unlike bodies. (a) Chemiotaxis—intra-nuclear. (b) Chemiotasis—internuclear and cyto-plasmic.

FIG. 3.—Clasmatocyte of triton after Rauvier. (a) Active. (b) Passive.

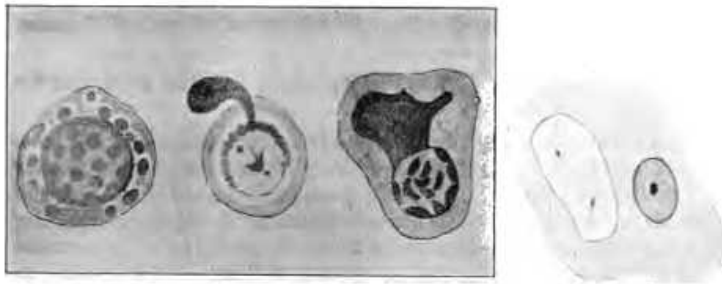
The glands—or rather, those that are visible, roughly speaking, vary in size from that of the merest pin's head to that of an almond. There is no limit to their numbers in different individuals, and they are distributed more or less unsymmetrically throughout the body.[4] They are aggregated, for excellent reasons, at certain points, chiefly under the skin *at the flexures*. They are also found in the trunk at sites corresponding to the Respiratory, Alimentary, and Uro-genital Tracts, here for certain reasons they are less in evidence. They drain various sectional regions, *only anastomosing with one another at the periphery* by their

4 Poirier, Cuneo and Delamere. "The Lymphatics." Translated by Cecil H. Leaf, M.B., F.R.C.S. 1903.

capillary vessels, between intercellular spaces. The brain and spinal cord, encased safely in their bony frame work, are more or less devoid of them.[5]

In lower animal forms, the lymphatic system has no glands, and rising in the animal scale those that inhabit a more septic environment have more glands than those found in purer regions—such as birds.

In relation to the arterial and venous system they are paravascular, but their peripheral capillaries are epi-vascular, corresponding to the peripheral channels in the Leucocytic cell.



a b c d

FIG. 4.—Leucocytes undergoing physiological and pathological degenerations, in which plasmosomes and filamental reticulum are involved—(a), (b) and (c) (after Adami); (d). Cancer cell (Archoplasmic vesicle), with Plimmers bodies (after Miller).

It is necessary to mention, incidentally, a peculiar property of these glands. I refer to their power of regeneration. In the case of other glands in the body, which occur symmetrically in pairs, such as the kidneys, it is well known that, when one is surgically removed, or destroyed from some cause, its fellow increases in size in order to compensate for the loss. This property is still more marked in the case of the numerous unsymmetrical lymphatic glands which seem to come into being wherever they are required for the needs of the body. This power of regenerating themselves independently is peculiar to them, and has a most important bearing in the economy. In fact, a phagocyte may be looked upon as a minute lymphatic gland on the move, for it is capable of performing the complete functions of a lymphatic gland, under certain suitable conditions.

"We must admit that our knowledge of the evolution of functions is very far from being as complete as our acquaintance with the evolution of structures. One might say in fact that the whole science of evolution has almost confined itself to the study of structures; the evolution of *functions* hardly exists even in name. Ontogeny is a recapitulation of

5 The medulla of bone, termed "lymphoid tissue" by Von Noorden, may be closely concerned with anabolism of lymphoid glands.