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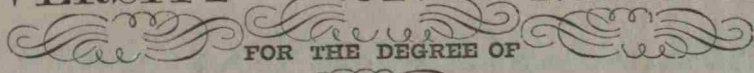
INAUGURAL DISSERTATION

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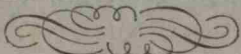
Lymphization.

SUBMITTED TO THE
PRESIDENT, BOARD OF TRUSTEES, AND MEDICAL FACULTY
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FOR THE DEGREE OF



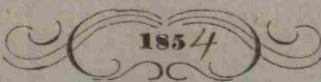
DOCTOR OF MEDICINE.

BY

Thos. G. S. Whitfill

OF

Missouri



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is*

To
Prof. W. K. Bowling
and
Prof. P. F. Eve,
This essay
is respectfully dedicated,
as a mark of esteem for their abilities
as teachers of medicine, by
the author.

Lymphization.*

Plastic lymph, or liquor sanguinis, is a highly vitalized material, endowed with the remarkable property of becoming organized, living, tissue.

It is poured out of the blood vessels as the result of inflammatory action; and, also, for the reparation of injuries which any of the tissues may sustain.

It is formed of fibrin, in combination with serum and a portion of the saline matters of the blood.

Ordinarily, it is transparent, of a

* Dr. Gross has proposed the use of this word in the sense of "effusion of lymph" or "deposition of fibrin". Path. Anat. p. 45. It is a convenient term, and is, therefore, employed here.

whitish, or yellowish white color; and, at the time of its exudation, it is a homogeneous mass, in a half fluid state, and possessed of great viscosity; - but, in undergoing organization, the serum is absorbed, and the fibrin becomes firm and solid.

As seen through the microscope, lymph appears to be composed of numerous parallel fibrils, of minute size, with a number of small granules dispersed amongst them. Through an inherent, vital force, these granules form groups of nuclei which become cells, and, eventually, organized substance.

With regard to the exact man-

ner in which organization is effected, there are two theories: one is, that the lymph has the power, per se, of elaborating blood, and that the blood, thus formed, furnishes itself with vessels.

The process is described as commencing with a few, small, red dots; - from these dots red streaks, or lines, radiate, and gradually become distinct, well marked, blood vessels. These new vessels then seek the surrounding tissues and anastomose with their vessels, by which means a free vascular communication is established between the new substance, and the original tissues.

The other theory is, simply, that the

Blood vessels of the normal tissues extend themselves into the deposit of lymph.

It is possible for both of these hypotheses to be correct, under different circumstances; - as, for instance, organization might be brought about by a self-developing action of the lymph, where it is isolated, in a certain degree, from the natural tissues by the interposition of serum or pus; - and, on the other hand, it might take place by the sprouting, or elongating, process in the case of incised wounds, &c.

Whatever may be the peculiar mode of their development, the analogous tissues possess, in a high degree, the characteristics of the

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structures into which they enter as
adopted substance.

Plastic lymph is capable of assimilation to nearly every original tissue in the system;—taking its character from the substance with which it comes in contact;—with cartilage becoming cartilage, with bone becoming bone, and so on.

The cutaneous and muscular tissues furnish exceptions to the rule; for, strictly speaking, they are not susceptible of reproduction;—in cicatrices there is no true skin formed; and in muscle, though there may be union of divided surfaces, the bond of union is ligament, or condensed cellular tissue, rather than muscle.

This fact is a little singular, considering the composition of muscle; for one might suppose if any tissue were reproduced it would be the muscular.

The analogous tissues though so nearly allied, in every respect, to the normal, are not impressed with an equal degree of vitality.

They yield more readily to inflammatory action and to the morbid influences of a vitiated state of the blood.

As illustrative of this last statement, it may be mentioned, that if persons who have cicatrices become badly affected with scurvy, the cicatrices will be destroyed and the wounds reestablished.

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Though, if not attacked by disease, or undermined by a bad state of the system, the analogous tissues, generally, preserve their vitality through life.

The amount of lymph thrown out varies with the part involved; - it is, generally, observed in the greatest quantities in the serous and cellular tissues. In other structures the amount is, usually, inconsiderable.

The length of time necessary for the exudation and organization of lymph is subject to variation; - in some cases it is poured forth in a few hours and organization takes place rapidly.

Lymph has been known to become

vascular in twenty nine hours; but, it cannot be completely organized in that length of time;— generally, several days, or even weeks, are required for its thorough organization.

The tendency to organization is greater in some tissues than it is in others; it is greater in the serous and cellular than it is in the mucous;— in fact, the mucous membranes show but little disposition to submit to the organizing process,— in consequence, probably, of their being open tubes, which conformation favors the expulsion of the lymph along with the ordinary excretions.

The consequences of organization are

opposite, in the extreme.

While, on the one hand, they are highly beneficial, highly essential, in fact, to the well being of the organism, on the other, they are hurtful, or even destructive of life.

Without the property of organization, with which plastic lymph is endowed, there would be no reparation of injuries which are constantly occurring to the system from accidents or disease.

The salutary or conservative operations of plastic lymph are most strikingly displayed in the healing of wounds, and in the uniting of fractured bones.

In the reparative process, as in the case of incised wounds, there is, at

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first, either the usual signs of inflammatory action, or there is an attraction of blood to the part; plastic lymph is poured out agglutinating the opposite surfaces of the wound; in the meantime, the vessels of the part shoot into the new material and supply it with blood.

That the new structure is developed in this way is evident from the fact that if the lips of the wound be separated a short time after adhesion occurs, little dots of blood will be seen on the divided surfaces indicating the points at which elongation of the vessels has taken place.

Some difference of opinion exists

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amongst pathologists in regard to the influence of inflammation on the reparative process; whilst some deem inflammatory action essential to the production of adhesion, others assert that inflammation is not only unnecessary, but even prejudicial to adhesive action.

Inflammatory action undoubtedly increases the plasticity of lymph, but, if, on the other hand, it proceed beyond a certain limit the lymph will be transformed into pus.

Altogether, it appears reasonable to suppose that an agent, capable of building up the tissues, de novo, without the aid of inflammation, as fibrin does, can repair those

tissues without assistance from such a source.

In the union of fractured bones, the first thing that takes place is an exudation of lymph around the fractured part; - in fifteen or twenty days this is changed into cartilaginous substance, termed provisional callus; - in a few weeks the callus becomes bone; - and in from six to nine months, ossific matter - the product of lymph - forms between the ends of the bone, and the provisional callus, being no longer wanted, is absorbed.

It is upon the reparative powers of plastic lymph that surgical operations are based.

The Taliacotian operation is, also,

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performed in view of this great law of lymphization.

It is said that certain parts, as the tip of the nose or the ends of the fingers, are susceptible of adhesion after having been completely detached.

Other advantageous results of lymphization might be mentioned, — as the agglutination of an internal organ, when in a state of abscess, to the abdominal walls, for example, and thereby favoring the escape of its contents externally: — also, the formation of a coat, or cyst, around an extraneous substance when introduced into the body, and by that means preventing irritation from being set up by the foreign matter.

The consequences of lymphization which prove detrimental, or even destructive of life, are various.

As a consequence of inflammation of the mucous membrane of the trachea, layer after layer of lymph may be deposited on the internal surface of the membrane until suffocation is threatened, or actually occurs.

Lymph may cause hepatization of the lungs by interstitial deposit; or it may cause adhesion of the pleura, crippling, or embarrassing the action of the lungs.

Adhesion of the pericardium to the heart may occur; or thickening of the valves of the heart; - from either of which conditions hypertrophy of

that organ may result.

In the abdomen, lymph may form bands, or strips, which sometimes cause strangulation of the bowel.

In the urethra stricture may be produced, by the deposition of lymph, either in the tube or around it.

It is supposed that lymph, in some peculiar form, is the source of tubercle and scirrhus.

It is thought that the lymph is insufficiently elaborated, and that the cacoplastic deposit, after maintaining its half-vitalized existence for an indefinite period, succumbs to physical laws.