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General laws of Inflammation

(From Treatise on Small pox.)

Simple inflamn. is so regular a process of the vis med. naturæ to restore an injured part to its pristine health + integrity, that we hardly ought to call it a disorder.

The simplest inflamn. such as arises on the intrusion of a thorn, or small splinter, or the application of variolous, or vaccine virus is, as near as we have been able to detect, as follows; — It first occasions an increased action of that living power, or vis vitæ, which every part of us, susceptible of stimulus, naturally possesses, and which is similar to a blush, being a momentary distention of the smallest vessels. For it is a law of our bodies that, when a part has more to do than merely to support itself, the blood is there collected in larger quantity.

The part, thus agitated, actually becomes more + more vascular; new vessels are absolutely generated; and thus gently commences the beautiful process of inflamn. The effects of vessels thus roused into new action is — what? Is a secretion of a pellucid fluid, not distinguishable from the gluten of the blood, or coagulating lymph, except by its effects.

Now, inflamn. is not only the forerunner, but the absolute cause of the formation of pus, and this is the modus operandi of it; — during inflamn. the smaller blood vessels, the veins especially

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are not only considerably enlarged, but, what may appear surprizing, they become more numerous; and these newly created vessels are so constructed, as to make the blood undergo certain changes, like a secretion, by which a pellucid fluid is formed, which transparent fluid is very soon afterwards changed into pus.

But what is pus? You will answer, perhaps, as people commonly do, that it is yellow matter, or corruption, and being satisfied with these unmeaning terms think no more of it.

We :: tell you that pus is a regularly secreted fluid; the offspring of a vigorous & healthy part, regularly exerting itself to restore the solution of continuity w.ch it has suffered. We have said repeatedly, that the chyle was a fluid composed of globules swimming in a watery liquor; and you all know that the red fluid circulating in our veins & arteries is composed of red particles swimming in a watery, or serous liquor. In like manner pus is whitish globules swimming in a transparent, watery fluid. This is the definition of pus, viz." globules swimming in a fluid which is coagulable by the fluids of "a solution of Sal Ammoniac, while no other secretion is."

Some of you may perhaps enquire, how is it known that a pellucid fluid precedes the formation of pus? By attending to the experiment following, you will see the matter demonstrated

a blistering plas

A blistering plaster, the size of half a dollar, was applied to the pit of the stomach of a healthy young man. In 8 hours a blister rose which was opened, & the contents removed; they were fluid, transparent, & coagulated by heat; but had no appearance of globules when examined by the microscope; and in every respect resembled the serum of the blood. The cuticle was not removed; but allowed to collapse; and the fluid, wc was formed upon the surface of the cutis, was examined from time to time through a microscope, to detect, as accurately as possible, the changes, which took place. The better ~~to do~~ this, as the quantity in the intervals about to be related being exceedingly small, a piece of talc, or isinglass, very thin & transparent, was applied to the whole surface, and covered with an adhesive plaster; and the surface of the isinglass applied to the skin, was removed, and examined through the microscope, a fresh piece of isinglass was applied after every examination, to prevent any mistake, which might have arisen from the surface not being quite clean.

The fluid was then examined through the microscope to ascertain its appearance. Now as the aqueous part in which the globules ~~swim~~ of pus swim, is found by experiment to coagulate by adding to it a saturated solution of crude Sal Ammoniac

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which is not the case with the serum of the blood, nor the transparent part of milk, (for milk is white globules floating in a watery fluid), this property we consider as peculiar to pus; and consequently we consider this as a just test of the absence or presence of pus, that is to say, of the absence or presence of globules.

In 8 hours from the time the blister was applied, the fluid discharged was perfectly transparent, and did not coagulate with the solution of Sal Ammoniac

see Hunter p. 88. & Home

From this experiment it appears that, if an irritating substance be applied to the surface of the skin, upon which it raises a blister, Pus will be formed in 24 hours. —

Home's Pathol. Dissn.

' In cases of wounds made into muscular parts, where blood vessels are divided, the first process which takes place, is the extravasation of red blood; the 2d. is the exudation of coagulable lymph, which afterwards becomes vascular; and the 3d. is the formation of pus; which last does not, in common take place in less than two days; the precise time ∴, will vary according to the state of the parts at the time; and according to the nature of the constitution'.

In ulcers of weakened & indolent parts pus is made up not of globules, but flaky particles; but the flaky appearance is no part of true pus. Their proportion is greatest, where the inflamt. is least perfect.

That the perfection, or non perfection of pus depends on the organs, or the weakness of the Vires Naturæ Medicatrices is apparent from the following fact. Twenty elderly men with worn out constitutions, were at one time in the same apartment of a large hospital on the sea coast of England. Each of these invalids had large ulcers on different parts of the body. These ulcers, when the weather was mild, dry, and

temperate

temperate, put on a healing appearance, & formed good matter. But any sudden change in the weather, either becoming rainy, or damp with fogs, produced so great and sudden effect on the discharge from those ulcers, as to change it in 24 hours from a healthy appearance to the very reverse; the whole ulcer being covered over with coagulable lymph, resembling melted tallow." This is a valuable fact, and shews how much the appearance of matter depends upon the state of the patient's general health, and how easily that health is altered by a change in the state of the atmosphere.

Pus is always in harmony with the parts, which form it, for it has no power of irritating them, even when the surrounding parts are affected by it. This seems to be peculiar to secretions; (e.g. poison of viper & rattle snake) and may be illustrated by the tears excoriating the cheek, although no such effect is produced on the lacrimal gland, or duct.

It does appear from observation, that when a part is forming pus, it assumes a structure similar to that of a gland, by becoming exceedingly vascular. This idea, which may appear novel & strange to some of you, derives weight & consequence from the opinion of the celebrated D. Jenner, who is an admirable anatomist & physiologist; he says,

"Nature

'Nature appears to have no more difficulty in forming minute glands among the vascular parts of the body, than she has in forming bloodvessels, and millions of these can be called into existence, in a few hours, when inflammation is excited'. So that the action, or process of inflam.n is in fact, the generation, or multiplication of blood-vessels.

No preternatural heat in an inflam'd part.

We have seen that inflam.n is absolutely necessary to the formation of pus; and this inflam.n is accompanied with a sense of heat, yet it is found from actual exp.s with a therm.r constructed on purpose, that the heat of an inflam.d part is no greater than that of any part in the neighborhood of the heart. Heat is not ∴ necessary for the formation of pus — J. Hunter irritated the tender organs of brutes (Mules) with corros. sub.s or applying the therm.r found the inflam.d part of the same temperature as other internal parts.

The chemical analysis of pus is precisely the same with that of the blood, & animal jelly.

Pus varies in its appearance according to the healthy or unhealthy condition of the person, or of the part that forms it. Pus formed from a part labouring under a habit of indolence, and pus formed in a part highly irritable, pass on a very different appearance. In indolent ulcers, whether the

the indolence arises from the nature, or state of the constitution, weakness of the parts, or the nature of the inflamn.; the Pus is made of a few globules, and of flaky particles floating in a transparent fluid; and these globules and flakes are in different proportions, according to the degree of indolence. This is particularly observable in scrophulous sores & abscesses, wc. are preceded by a small degree of inflamn. & scarcely any pain.

In irritable sores, the discharge is thin, being principally made up of an aqueous fluid possessed of an irritating quality, & containing but few globules.

The globules of pus differ from those of blood not only in their colour, but in their not being soluble in water, which those of the blood are; and above all, from the fluid in which they swim being coagulable by a solution of Sal Ammoniac, which serum is not.

Having

Having given you the laws of the human system as it respects the formation of pus & its consequence granulations, let us before we dismiss the subject attend to the practical inference which ought to be drawn from them.

In a healthy person, inhabiting a clean place, breathing a salubrious air, and living temperately, a train of salutary processes are going forward in his system; Digestion is well performed, the chyle is proper, blood made from that chyle is perfect & the secretions & excretions are natural and regular. If a simple wound be inflicted on such a person, inflamn. thence arising, would be regular in all its stages; the pus formed would be replete with globules, & perfectly sweet; the consequent granulations a concomitant effect of the same cause, would be florid and firm, and a perfect restoration of the wounded part would soon follow. — Now if such a person be inoculated with matter from the most malignant sort of small-pox, taken at the proper time, his pustules will nevertheless be distinct, the basis of each will be encircled by a border of crimson, the intermediate spaces will approach to the colour of the damask rose, the matter in each pustule will in due time acquire a yellow colour and laudable consistency. The vires vitæ are here strong enough

to throw up a rampart against the enemy, & to repel him. The fever, accompanying such a state, is of the true *synocha* type.

But in a person otherwise situated, and predisposed, other symptoms will appear, if inoculated with the same matter. In him the symptoms come on sooner, are more numerous, appear in clusters, like the measles, and do not maintain their circular figure and spheroidal form; but run one into another & become flat; and, when the pustules are in a measure distinct, their bases are not bounded, as in the former case, by an inflamed margin, while the skin, that is free from pustules, is pale & flabby. The matter in these vesicles is a ~~[illegible]~~ brownish sanies & the accompanying fever is *typhoid*, or nervous; while the concomitant inflamm. is of the *Erysipelatous* species, or that sort, which shows a disposition to spread, or rather no disposition to set bounds to itself, as in the distinct small-pox. Now it is a law of our system, that were perfect pus is formed, the sore does not spread. — At this period of s.-pox, should the depressing effects of fear unfortunately concur, the edges of the eruptions will soon show that they are too weak to resist the encroaching evil, and will all run into one shocking sore. Now instead of yellow matter, or pus, only ichor is produced. Soon after purple spots appear, profuse haemorrhages of thin corrupt blood pass off by the

by the several outlets of the body, and the sufferer sinks under the weight of misery.

In such cases the violence of the disease is not occasioned by the greater malignity of the variolous poison that is used; but it is owing to the vires Naturæ medicatrices being too far depressed to resist the potentia nociva. Hence the imperfect inflam.n & imperfect suppuration; hence the symptoms of approaching dissolution, indicated by the incapacity of each pustule to confine its own matter; for it is a law of our system, that where perfect pus is formed, the sore does not spread.

Whoever closely attends to the procedure of inflam.n, to the formation of pus, the progress of granulation, together with the process of ulceration, will discern the regular steps, by which Nature advances towards a cure. He may likewise observe how, when baffled in her first intention, She directly has recourse to a second, and to a third, in order to restore a disordered part to health; and finally you will be able to judge what ought to be expected from the perspicacity of an able physician or surgeon whose office it is, not to stand an idle spectator of Nature's efforts in attempting her own cure, but must exercise his judgement in restraining those efforts when too violent, exciting them when too inert & languid, & when deviating from the right way to bring Nature again into the proper track; for a skillful P. is but Nature's minister