through large nerve trunks sometimes cause delirium, and surgical shock is principally due to the severance of nerves, the loss of blood, and the mental effect of the occurrence. Where a considerable area of skin is involved, the shock is proportionately great, due to the implication of the larger number of sensory nerves, e.g., an extensive superficial burn is much more dangerous than one of small size which penetrates deeply. When a wound suppurates, the pain is of a throbbing nature, and is usually accompanied by some feverishness; the sensitiveness of the wound and the parts in its immediate neighbourhood is generally increased.

"*Dangers of Wounds.*"—The immediate danger is that of hæmorrhage. The remote danger is that of sepsis or infection of the wound with pus-producing organisms.

"*The Repair of Wounds.*"—The healing of wounds depends to a great extent on the individual, since some people heal more readily than others. We must take into account the state of the health, the presence of diseases, e.g., Diabetes, Bright's Disease, and other general disorders which modify the process by lowering the patient's vitality. As a general rule young people heal more rapidly than the aged. The process of healing depends also, to some extent, on the tissues involved; the connective tissues heal most readily, but the more specialised the structure, the more difficult is the repair. As soon as a wound is made, an exudation of serous fluid takes place. This serum contains leucocytes, and when the edges of the wound are brought together it forms a kind of cement, and on account of this property is called a plastic exudation. This exudation takes place from both sides of the wound, and softening of the parts occur, due partly to the exudation and partly to the movements of the leucocytes. In most wounds, too, a small quantity of dead tissue is present: varying in amount with the sharpness of the producing cause.

When a wound heals aseptically, the leucocytes absorb these dead tissues, but if suppuration occurs they are lost in the discharge.

Plastic exudation helps to keep the surfaces in apposition until the new cicatricial tissue is formed, and at one time the leucocytes were believed to form this new tissue. A later theory credits the fixed tissue cells of the wound with the new formation, and it is generally admitted that though the leucocytes in some way assist, the great bulk of reproduction is due to these fixed cells.

The best possible kind of healing takes place without the occurrence of any inflammation, and requires at least six to eight days, so that there can be no such thing as immediate healing.

Wounds heal in two ways (*a*) by "First Intention," which really means healing without inflammation or suppuration, and (*b*) by "Second Intention" or "Granulation," which indicates that inflammation and suppuration delay the process of healing. It should be remembered that all the permanent material employed in the healing of wounds, is derived from the fixed tissue cells, and that the leucocytes (white blood corpuscles) act firstly as a temporary cement in the closure of the wound, and latterly as food for the young cells of the fixed tissue. These new or young cells form what is called granulation tissue, of which every wound has a greater or less amount. The quantity of granulation tissue varies; it is least in aseptic incised wounds, and greatest in injuries where there has been a large loss of tissue, and where suppuration occurs. Granulation tissue consists of a delicate network containing leucocytes and young connective tissue cells in its meshes; when the granulation tissue is well developed these embryonic cells are seen through the microscope to be two or three times larger than the leucocytes. Healthy aseptic granulation tissue appears to the naked eye as a number of small rounded elevations of firm consistence and pink in colour, the surface being only moistened with a colourless viscid fluid. Granulations may be unhealthy, and the following are the principal causes of the deviations from the normal conditions:—"Firstly"—infection by pyogenic (pus-producing) and pathogenic (disease producing) micro-organisms. These so affect the granulations that instead of proceeding to repair the wounds they die and are shed as pus. The invasion of the micro-organisms may extend to the fixed tissue, and, by causing their destruction enlarge the area of the wound. "Secondly"—movement of the healing parts prevents the organisation of the granulation tissue and delays the healing considerably. A certain amount of movement sufficient to delay the healing of the soft tissue may absolutely prevent the healing of a rigid tissue, such as bone. "Thirdly"—Deficient or excessive blood supply may modify the character of the granulations considerably. In the former case the granulations are small, pale, and anæmic lacking vitality and showing little or no tendency to heal. A typical example of this kind of granulation is seen in pressure and bed-sores. Where there is an excessive blood supply the granulations are dark in colour, full, and sometimes projecting beyond the margins of the wound, and then they are called exuberant granulations or "proud flesh." They are usually associated with considerable escape of serous fluid, and they are apt to bleed when touched.

"Fourthly"—The effect of constitutional weakness whether due to some general disease or simply weakness from malnutrition, is to impair the successful healing to a marked extent. The formation of blood-vessels keeps pace with the proliferation of tissue cells until a sufficient amount of granulation tissue has been produced, when the newly formed blood-vessels diminish in number. These vessels are newly formed structures which grow from pre-existing vessels; they are numerous and their presence gives the granulation tissue its red colour. When healing is complete these temporary blood-vessels disappear.

Cicatrix is the name applied to the scar which persists after a wound has healed. The smallest cicatrices are seen after the repair of an incised wound which has healed aseptically. Large cicatrices indicate delayed healing from one or more of the causes mentioned, and they persist in cases where there has been great loss of tissue.

"*Repair of the Skin.*"—New skin is always produced from pre-existing epithelial cells, usually from the skin at the edge of the wound, from little islands of partially destroyed skin, or from transplanted skin. Skin cannot be produced from any other tissue except skin.

A healthy wound in process of cicatrisation shows the following parts:—In the centre there is moist granulation tissue surrounded near the periphery by a dry red zone, which is granulation tissue with thin transparent epithelial cells. Outside this there is a blue zone, where the epithelial layer is thicker but still somewhat transparent, and outside of that is a thicker white zone continuous with the skin. When the wound is covered with blood clot, sometimes called a scab, this is cut off by the projection of the second layer of epidermis—stratum lucidum—so that when the epithelial growth is complete the scab is shed. Healing thus takes place on the surface of the wound first, the underlying parts being meanwhile more or less stationary. Cicatrices are at first red, but that redness quickly disappears. Undue persistence of redness indicates that the wound has healed slowly. A cicatrix differs from the normal skin in as much as the sweat glands and hairs are not reproduced, the nerve supply being also deficient. If, after a wound has healed, there is a progressive growth of scar tissue, the condition is called "Keloid," and it is worthy of note that these scars are sometimes the seat of malignant growths at a later period in the life of the patient.

(*To be concluded.*)

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