Langerhans has produced fat-necrosis by the injection of pancreatic extract into the perinephric fatty tissues of dogs. Hildebrand and Dettmer have shown experimentally that the necrosis is due to certain constituents of the pancreatic juice, but not trypsin. This ferment is steapsin, and its presence has been demonstrated in certain instances of the disease by Flexner. This authority has also produced hemorrhagic pancreatitis by the injection of artificial gastric juice into the pancreatic duct. Opie has also produced the condition by the injection of bile into the pancreatic duct of dogs, and has shown that the penetration of bile into the pancreas may be the cause of the disease in nature.

**Progress in Medicine and Surgery.**

**Carcinoma.**

On the Method of the Spread and Dissemination of Carcinoma and its Influence on Treatment.—Whilst we vainly wait for any definite results from the many researches into the cause and prevention of cancer, the subject of its radical removal must remain that of the most practical importance in the study of the disease. It has been generally held that carcinoma is spread by a process of embolism of the cancer-cells in the lymphatic and blood-vessels. But in the case of the breast, Handley has shown that this view must be modified. According to this authority the cancer-cells actually spread along the lymphatic channels by a process of continuous growth, and that this permeating growth takes place as readily in a direction contrary to the lymph stream as with it. The first difficulty in accepting this theory is the fact that if a late case of mammary carcinoma be examined, the region immediately round the primary growth contains no permeated cancerous lymphatic trunks. Isolated nodules of growth are present which suggest the position of emboli. But it appears that if an area of the tissues at a greater distance from the growth be examined microscopically, it will be found that the lymphatic trunks are all permeated with cancer-cells. Thus, in every case three distinct zones may be distinguished. First, in the centre is the primary growth; round this is a zone in which the lymphatics are devoid of cancer-cells, but in which isolated nodules of growth may be present; and a third zone, which appears normal to the naked eye, forms the true margin of the growth, and here the lymphatic channels are filled with malignant cells. This last zone may be described as the microscopic edge of the growth. To explain the freedom of the lymph channels from cancer-cells in the intermediate zone, it is stated that a process of peri-lymphatic leucocytosis is set up by the malignant cells growing in the lymph vessels, and that this causes a fibrosis which destroys them. So that a double process of peripheral extension and central destruction of the carcinoma proceed at the same time, and the whole method of growth may be compared to that of a ringworm or serpiginous ulcer. But at the same time that the cancer-cells are permeating the lymphatic vessel, they may be forced into the lymph capillaries outwards to the skin or inwards to the body wall. And when in these situations the cancer-cells break through the walls of the lymph space, they then form the nucleus of a cancer nodule. In confirmation of this theory of the centrifugal spread of carcinoma are the facts of the distribution of the secondary malignant nodules in the skin and of the deposits in bones. The nodules in the skin always make their first appearance close to the primary growth, and later at points successively more and more remote from it. The area within which they are found is invariably a circle of continually increasing diameter with the primary growth at its centre. And in those rare cases when nearly the whole trunk is covered by secondary nodules, the arms below the deltoid insertion, and the legs below the middle of the thighs, always remain free. In bone metastases, too, as seen in 329 cases observed during thirty years at the Middlesex Hospital, those bones are most frequently affected which lie nearest to the primary growth. Thus, the sternum, ribs, femur, spine, humerus are the bones most often invaded, and that in the order mentioned. The fact that the femur and humerus are affected more often than such bones as the scapula is explained by the intimate relationship which the deep fascia has to the former, in the situation of the trochanter and the deltoid insertion. But no explanation is offered of the facts that the clavicle is seldom affected, less often indeed, than the cranial bones, or that the bodies of the vertebrae are involved rather than the spines and laminae. But only one case in this whole series shows involvement of bones distal to the knee or elbow, and therefore it is impossible to regard bony metastases at any rate, as embolic in origin, because if this were so it would be the distal bones which would be most often the seat of the growths. As regards visceral invasion, the same method of direct permeation of lymph channels is said to take place. In this there are three stages. First the network of lymph vessels which lies in the deep fascia is involved, then the deep branches of these vessels which perforate the body wall, and lastly the serous membrane which lines the thorax and abdomen, carries the cancerous process to the viscera. If the blood were the main channel of diffusion the thoracic viscera would naturally be invaded more frequently than the abdominal. But this is not the case. Indeed, the abdominal viscera are more often attacked than the thoracic, and in 12 per cent. of autopsies the abdominal viscera present metastatic growths, while the thorax is quite free. This is explained on the permeation hypothesis by the fact that in the linea alba there exists a weak spot in the defence of the body cavity where the cancer-cells find a short path from the fascial lymphatics to those of the abdominal cavity. The facts brought forward are so clear that the truth of these propositions must be admitted. But at the same time it is difficult to understand why general peritoneal infection by carcinoma is not
more common than isolated deposits in the viscera. But of the importance of the deep fascia in the process of disseminating cancer there can be no doubt, and it is also probable that the skin plays quite a secondary part, as it contains only terminal lymph capillaries, and not the main lymph vessels. From this it follows that in the radical operation for mammary cancer more attention must be paid to a wide removal of deep fascia, especially in the epigastric region, and less attention need be paid to a wide removal of skin. Thus, a circular incision about five inches in diameter will suffice to remove the primary growth, together with the lymphatic glands, and then by radiating incisions upwards and downwards the skin can be turned up and the deep fascia removed as far as the mid-line and down to (and including) that covering the epigastrium. The skin can then be easily brought together without the necessity of skin grafting. If after this secondary nodules appear on the skin, the course to be pursued depends upon their position. If they overlie the area from which the deep fascia has been removed, they may be regarded merely as isolated growths and removed by a small incision. But if they overlie parts in which the deep fascia has been left, a widespread area of underlying permeated lymphatics is indicated, and operation will be useless. Cheatle discusses the same problems of the spread of cancer in the case of epithelioma of the tongue. He bases his observations on sixteen cases of advanced disease which were removed by operation. It is a peculiar fact that the disease is often limited by the mid-line, and also that it seldom spreads from behind to the tip of the tongue. But this limitation of the growth by the mid-line in advanced cases is only superficial, and the cancer has often invaded the opposite side deep in the substance of the organ when in the surface it seems to be unilateral. This shows that the median raphe has nothing to do with the limitation of growth, because it is well marked in the depth of the tongue and is not present in its surface. In all the advanced cases the extrinsic muscles were involved in the growth, and, indeed, it seems that it is along the actual muscle fibres that the growth extends, rather than, as might have been thought, in the inter-muscular septa. The hyoglossus, the genioglossal portion of the genio-hyglossus, and the inferior lingualis muscles are specially liable to involvement. It is therefore better in all advanced cases to attempt to remove these muscles right down to their attachment to the hyoid bone.

DISEASES OF THE DIGESTIVE ORGANS.

Gastric Dyspepsia.—A classification of the functional disturbances of the stomach has recently been proposed by Hutchison, who points out that much of the vagueness and confusion which surrounds the subject of dyspepsia is due to the fact that physicians have been content with describing its sub-groups by symptoms instead of by patho-

logical processes. No doubt, in the evolution of our knowledge this has been the usual sequence of events, and very possibly the time has now arrived for scheduling our experiences of stomach disorders on more scientific lines. In place, then, of “acid dyspepsia,” “atomic dyspepsia,” “flatulent dyspepsia,” and so on, Hutchison would have us divide the diseases of the stomach in which no gross lesion is present, according to the disturbance of function which is present. The stomach functions are secretory, motor, and sensory. Any of these may theoretically be disturbed in the direction of either diminution or augmentation, but practically there is probably no such condition as diminution of the sensibility of the stomach, as normally the stomach performs its work without producing any sensations in consciousness. Thus, we have five conditions to consider: (1) Increased secretion = hyperchlorhydria and continuous hypersecretion; (2) diminished secretion = hypoclorhydria and achylia gastrica; (3) increased motility = pyloric spasm and torrmedia ventriculi; (4) diminished motility = motor insufficiency leading to dilatation; (5) increased sensibility = gastralgia or hyperaesthesia of the stomach. Hutchison goes on to point out that these various groups are usually combined, decrease in motor power and secretory power, producing atomic or nervous dyspepsia with flatulence, increase of sensibility and secretion producing hypertonic dyspepsia, of which the chief symptom is pain. Hutchison, in common with all other modern authorities, rightly lays stress on the importance of a thorough examination of the stomach-contents by means of the stomach-tube. By this means the motor and secretory power of the stomach can be determined. He remarks that he has not found that patients as a rule object to the procedure, but the conditions under which the ordinary general practitioner finds himself are certainly different; and it may be doubted whether the public is at present prepared for this valuable diagnostic measure to the extent to which some specialists would have us believe. In dealing with the relationship between disturbance of function and symptoms Hutchison points out that without hyperaesthesia increased secretion probably produces no symptoms, and that the chief cause of serious dyspeptic symptoms is impairment of motor power. Decreased motility leads to flatulence, weight, discomfort, but not to actual pain; increased motility to “spasm” mainly in the pyloric region. Hutchison does not consider flatulence as due to microscopic fermentation, and in this is in agreement with the eminent French writer, Soupaun, who says he considers stomach gases mainly arise from air-swallowing, partly from regurgitation through the pylorus, only slightly from fermentation, and not at all from exhalations from the blood-vessels in the stomach walls. As regards the hyperaesthetic condition of the mucous membrane, which Hutchison thinks the cause of pain in connection with hypersecretion of HCl, it is not clear whether his views correspond with those of Soupaun. The latter is inclined to attribute the pain mainly to pyloric spasm, which can be relieved by gastrojejunostomy, though the causation of the spasm is