

form, and to facilitate the rotation of the flap, a wedge-shaped portion (b) may be excised from the base of the flap. In this operation the vermilion border of the flap must be removed, and the fissure in the lip is to be closed at once. Perforations of the nose resulting from wounds or ulcerative processes are generally seated at the sides of the nose. They may readily be closed by flaps of suitable shape and size, taken from the forehead, from the cheek, or from the opposite side of the nose.

The nasal column, when it alone is defective, can be admirably repaired from the central portion of the upper lip, which must be included between parallel perpendicular incisions. When the flap thus formed is brought in contact with the nasal septum, its mucous surface is of course exposed, and is eventually converted into skin.

In the most complicated of nasal defects, finally, other parts of the face are also, as a rule, deficient. This is particularly true of the upper lip, of portions of the palate, and of the cheek. In such complicated cases, as has already been intimated, many operations are required before the face can be made at all presentable. In cases of this character the lip, the angle of the mouth, and the nose all require separate operative treatment. If, however, from one to three years be devoted to the judicious management of such a case, the result will in every way repay patient and operator for the patience displayed.

Paraffin Injections in Reparative Surgery.—In order to fill up the scrotum of a very sensitive young man, which had been left empty after a castration, Gersuny¹⁵ in 1900 devised the ingenious method of injecting vaseline. Encouraged by the good result obtained in this case, he extended the procedure to cases in which other than the distinct cosmetic effect was desired. The result which Gersuny¹⁶ obtained in a case of urinary incontinence in a female, which had resisted all other methods of treatment, was so brilliant that other surgeons at once took up the new procedure, and so its use soon became widespread. A considerable amount of good work has been done at von Bergmann's Klinik by Stein.¹⁷ He prepares paraffin, which should have a melting point between 42° and 43° C., by melting and filtering with a hot-water funnel, such as is used in the filtration of bacteriological culture media. The filtered paraffin should be put into wide-mouthed flasks, such as Erlenmeyer's, and plugged with cotton wool. In these it is sterilized in the hot-air oven at a temperature of 200° C. for a half-hour, and can then be preserved indefinitely, ready for use at any time. Before using, the flasks containing the paraffin are heated in a water-bath to the melting point. The injection is made with a Pravaz syringe, wholly made of glass, holding about 1 gm. The object is to have a syringe devoid of all sharp corners and edges, so that the paraffin does not so easily congeal. Before injecting the paraffin, the filled syringe is again put into hot water and then the needle is screwed on. The injection is made by lifting up a fold of skin with the left hand and with the right inserting the needle and injecting slowly until the desired amount has been used. The needle is then withdrawn and a small piece of plaster fastened over the puncture. The paraffin is now moulded into the desired shape, while an assistant allows the ethyl chloride spray to play upon the part. Several injections may be made at different times, but care must be used not to insert the needle over the area previously injected, as it should be inserted to the side of it. According to Juckoff¹⁸ paraffin after its injection acts like any foreign body, and causes a reaction-

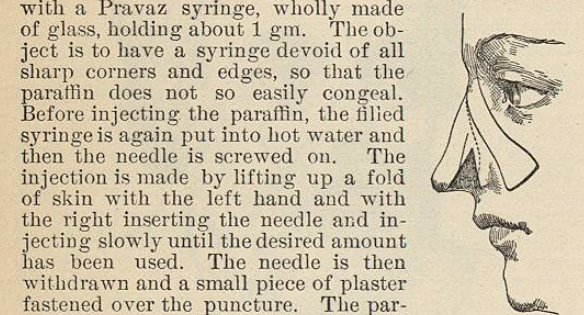


FIG. 4020.

ary inflammation with the formation of new tissue. Some of the paraffin is absorbed here and there, so that finally we have the mass pervaded by connective-tissue strands, which emanate from a fibrous capsule around the whole. This capsule is fused with the adjacent tissue.

This excellent method is not without a small amount of danger. The following unfortunate occurrences have taken place: Embolism of lung and intestinal organs from the accidental insertion of the needle and injection into a vein; infection from faulty asepsis; gangrene and sloughing from the introduction of too much paraffin, as a result of which obliteration of the blood-vessels has occurred.

The method is applicable to cases in which the normal contour of the body is lost. It has been used with distinct benefit in saddle nose following caries of nasal bones. In one case treated at von Bergmann's Klinik, the result was striking. Several injections were made at different places and the nose was thus gradually built up. The injection should be made with care so that none of the paraffin shall find its way into the orbit. Cleft palate may be treated by this method, which is chiefly applicable to those cases in which a small foramen has remained after staphylorrhaphy. The contour of the cheek might be re-established after removal of the superior maxillary bone. The scrotum may be filled up after castration. The method is applicable to another class of cases, namely, those of urinary incontinence, especially in the female, in which condition a ring of paraffin is injected about the neck of the urethra so as to replace the sphincter. A cystocele has also been treated, with distinct benefit, by injections between the vagina and bladder wall. By establishing a paraffin depot around the rectum fecal incontinence has been cured. The method is still new and sufficient time has not yet elapsed to establish the permanency of cure in many of the brilliantly successful cases; nor have there been many opportunities to examine the changes produced in the tissues, beyond those produced experimentally on animals in the laboratory. The method promises much in the future, and certainly is a valuable aid to our surgical technique.

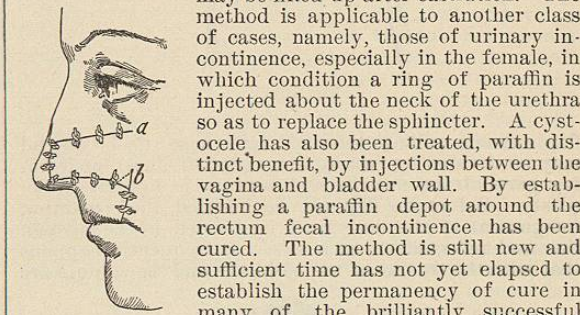


FIG. 4022.

produced in the tissues, beyond those produced experimentally on animals in the laboratory. The method promises much in the future, and certainly is a valuable aid to our surgical technique.

- Joseph Ransohoff.
- ¹ Zeits. d. Literat. und Gesch. der plast. Chir., Leipzig, 1863.
 - ² Celsus: Lib. vii., cap. ix.
 - ³ Gurdon Buck: Repar. Surg., p. 11, 1876.
 - ⁴ Demucé: Arch. gén., 1855, t. vi., p. 402.
 - ⁵ Szymanowsky: Oper. on the Surface of the Body, Kiev, 1865. In Russian only.
 - ⁶ König: Lehrb. der Chir., Bd. I, p. 223.
 - ⁷ Arch. f. klin. Chir., vol. xxiii., p. 323.
 - ⁸ O. Weber: Pitha und Billroth, Bd. iii., 1., p. 148.
 - ⁹ Arch. f. klin. Chir., 1., p. 95.
 - ¹⁰ Ollier: Compt. rend., 1861, 53, p. 84.
 - ¹¹ Arch. f. klin. Chir., 5, p. 33.
 - ¹² Gaz. hebd., 1., p. 416.
 - ¹³ Chir. Répar., p. 118, 1854, Verneuil, p. 311.
 - ¹⁴ Gersuny: Zeitschrift f. Heilkunde, 1900, Bd. 1., Heft 9.
 - ¹⁵ Gersuny: Centralblatt f. Gynäkologie, 1900, No. 48.
 - ¹⁶ Stein: Deutsche med. Wochenschrift, 1901, Nos. 39 and 40.
 - ¹⁷ Juckoff: Ueber die Verbreitungsart subcutan., etc. Arch. f. exp. Pathologie, Bd. xxxii.

REPRODUCTION.—The various processes by which new organisms are produced are included in the general term, *reproduction*.

It was thought by the ancients that many organisms of complicated structure, such as worms, insects, plants, etc., could be formed from mud, decaying material, and other dead matter by a process of spontaneous generation, or *abiogenesis*. It was proved by Redi in 1688 that *abiogenesis* does not occur in insects, but it remained for Pasteur and his colleagues in the latter half of the nineteenth century to show that even the minute and simply

organized bacteria are always produced by division of the living substance of pre-existing individuals of the same species; that is, reproduction in the present condition of the world is always a process of *biogenesis*. Not only is every organism produced by a pre-existing organism, but every cell arises by division of a pre-existing cell, and every nucleus by division of a pre-existing nucleus. (See *Cell*.) Moreover, there is good evidence for the belief that the minute but apparently important elements of the nucleus, known as *chromosomes* (*q. v.*), are also produced only by division of pre-existing chromosomes. So reproduction, like all other vital functions in health and disease, must be regarded as essentially a cellular phenomenon.

Reproduction may be either sexual or asexual. The essential feature of *sexual* reproduction is the development of an embryo from a *fertilized* egg, that is, a germ produced by the union of an *ovum* and a *spermatozoon*, or their equivalents (see articles *Ovum*, *Spermatozoon*, and *Impregnation*). The capacity to produce one or the other of the reproductive elements, together with the associated peculiarities, constitutes the quality of *sex* (*q. v.*). Both of the reproductive elements are cells derived from apparently indifferent germ cells by an interesting process of development, which is discussed under the heading *Reduction-Division*. This process takes place in certain special organs, for which the general name is *gonad*, the female gonad being called the *ovary* and the male gonad, the *testis*. When the eggs or spermatozoa are ripe they are discharged from the gonad, and fertilization may take place outside of the body, as in most fishes, or within the oviduct (Fallopian tube, uterus, etc.), as in man. In man and other mammals the discharge of the ova is associated with certain peculiar physiological phenomena described in the article on *Menstruation*.

Fertilization having taken place, the egg proceeds to divide by the usual process of cell division, and by repeated divisions forms a mass of cells which becomes the embryo. The details of this process vary in different animals, as will be seen by reference to the article on the *Segmentation of the Ovum*. Sooner or later the cells of the embryo begin to differ among themselves in accordance with their destiny in the formation of organs. The causes of these changes are discussed under the title *Differentiation*, and the development of the embryo in form and structure is described in detail in the articles *Fetus* (in THE APPENDIX), *Area Embryonalis*, etc.

Both during development and in the adult condition there is a noticeable similarity between parent and offspring at corresponding stages. This is a fact of great importance, and is fully treated in another place (see articles *Heredity* and *Reversion*).

When reproduction takes place by some method without the aid of a fertilized egg, it is said to be *asexual*. In the bacteria and some of the lower animals the reproducing individual divides into two or more nearly equal parts. This is called *fission* (*q. v.*). In the yeasts, the higher plants, and some animals, a small part of the parent grows more rapidly and becomes differentiated into a new individual. This is *budding* (*q. v.*). A third form of reproduction occurring normally in some species is known as *parthenogenesis* (*q. v.*), which may be regarded either as an asexual or as a degenerate sexual process. In such cases the offspring is produced by the development of an egg without fertilization. Robert Payne Bigelow.

RESALDOL is a light-brown powder prepared by the action of chloromethyl-salicyl on resorcin by means of acetylation. It is insoluble in water, ether, chloroform, benzol, and acids, and soluble in alcohol, acetic ether, and alkalis. Its taste is insipid and astringent. On account of its insolubility in acid media it causes no derangement of the stomach (Hermann), but in the intestines sets free the diresoreyl radical and acts as an astringent and antiseptic. Hermann recommends it in acute and chronic diarrhoea, colitis, the early diarrhoea of typhoid fever, intestinal putrefaction, and infantile diarrhoea, and he finds it useless in nervous diarrhoea or that due to mechanical

irritation. Brochocki employed it in twelve cases of tuberculous enteritis, four of acute gastro-enteritis, three of catarrhal dysentery, and three of typhoid. All except the typhoid cases improved, though xeroform, bismuth, and opium had failed. The dose is 1-1.5 gm. (gr. xv.-xxiv.) three times a day. W. A. Bastedo.

RESECTION OF THE JOINTS.—The history of this operation dates from the year 1783, when Henry Park formally proposed the operation for the removal of disease. In 1786 Moreau first performed it, and became its staunch advocate as a method of treatment. Little was done, however, until Syms in 1831 in the elbow, and Ferguson in the hip, knee, and wrist, made use of this operation as a conservative method of treatment ("Excision of Joints," R. M. Hodges, Boston, 1861). Since this time this method of treatment has been wonderfully advanced and has been adopted by the ablest surgeons.

A resection is the removal of a portion of the skeleton without great sacrifice of the soft parts. Applied to joints it has for its object the more or less complete removal of the bones forming the joint, the preservation of the sensibility, contractility, and vitality of the soft parts influencing the joint, and the ultimate restoration of motion or the production of ankylosis.

When motion is desired—the ideal object of articular resections—the ends of the bones left in contact must be adapted to one another, and so fashioned in shape as to reproduce the joint surfaces removed. The muscles which move the joint must be left undisturbed in their attachment; or, if disturbed, restored so that their functional action is not compromised.

The ligaments and fibrous bands which subsequently develop and unite the bones must be analogous to those present before operation. To obtain this end, all ligaments must be preserved with their bony or periosteal attachments.

To attempt a nearthrosis with a sacrifice of the muscular and ligamentous attachments often results in a useless pseudarthrosis, inferior in every respect to a useful ankylosis.

To obtain mobility with steadiness and strength in action the preservation of the muscular and ligamentous attachments to the periosteum and the continuity of the articular capsule with the periosteum must be made the main object of the operation. Such a method of operating is known as the subperiosteal or subcapsulo-periosteal resection. Its object is motion with strength and steadiness in action.

In case a solid union—ankylosis—is desired, two conditions arise which influence the result. The first is seen when the divided ends of the bones can be brought into apposition and their fusion takes place directly. In this case ankylosis is assured, provided the disease is removed. The second condition exists when the divided ends of the bones cannot be brought into apposition, but are separated by an appreciable distance from one another. The union here takes place principally through the agency of the periosteum, and ankylosis, more or less doubtful and dependent upon the osteogenic power of the periosteum, results. It is in this latter variety that the pseudarthrosis and flail joints occur.

When ankylosis is desired and is reasonably attainable, the preservation of the muscular, ligamentous, and capsular attachments to the periosteum are of secondary importance.

When bone or a bony prominence is separated and replaced *in situ* in order that diseased tissue can be more thoroughly removed, the resection becomes an osteoplastic one.*

Again, resections are either complete or partial: complete when the component bony surfaces are removed; partial when one or more, but not all the articulating surfaces are removed.

Resections may therefore be partial or complete, par-

*This term is sometimes used and applied to operations in which bones not normally apposed are brought together after removal of the intervening bone or bones.