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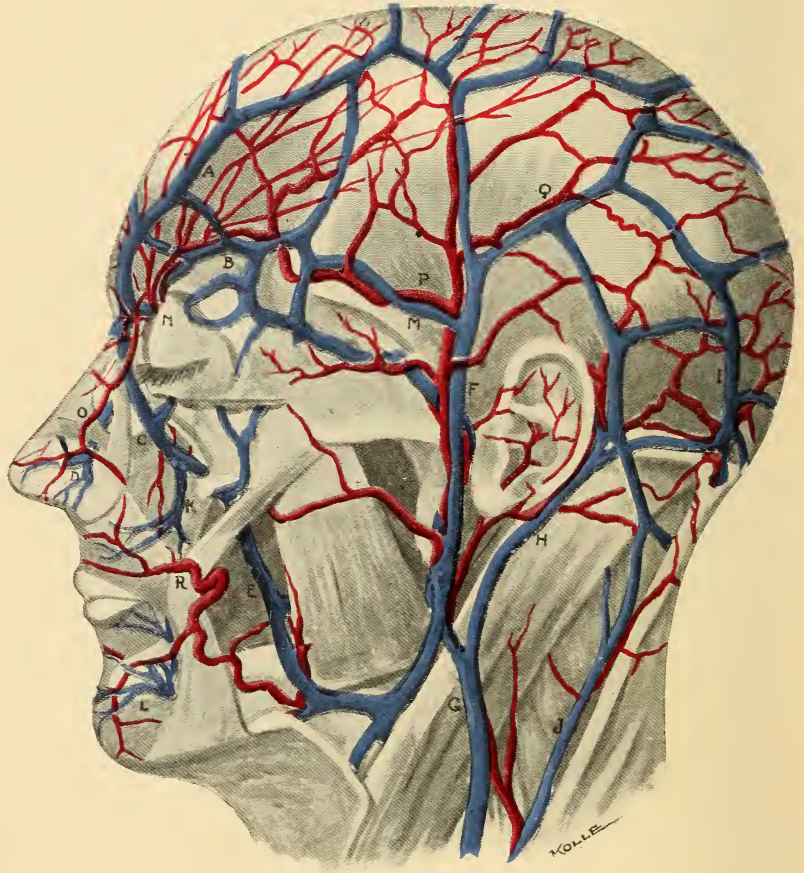
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SUBCUTANEOUS HYDROCARBON PROTHESES

BY

F. STRANGE KOLLE, M. D.

AUTHOR OF "THE RECENT RÖNTGEN DISCOVERY"; "THE X-RAYS,
THEIR PRODUCTION AND APPLICATION"; "MEDICO-
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THE GRAFTON PRESS

PUBLISHERS

NEW YORK

31125
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Two Copies Received
MAY 12 1908
JULY 18th 1897
May 12 1908
CLASS A XXC. (11)
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FOREWORD.

The object of the author has been to place before the profession a thoroughly practical and concise treatise on the subcutaneous employment of hydrocarbons for the correction of defects about the face, neck and shoulders. The importance of this particular branch of cosmetic surgery is at the present time undeniable. It has revolutionized certain extensive operative procedures, especially in Rhinoplasty, giving results that no surgeon could hope to attain under the former laws of surgery.

The literature on this subject is widely scattered and scanty. It consists mostly of small detached papers or reports of special cases by different surgeons in different countries. The author has selected from the most authoritative sources, such of this data as he deemed necessary for a full presentation of the evolution of the methods used at present, and combined these with the results of his own practical experience in several thousand prothetic operations.

Great care has been taken to give as faithful representation of the cases illustrated as possible, bearing in mind that the actual cosmetic improvement is greater than can possibly be shown in black and white.

The exponents in the text refer to the authorities given in the back of the book.

F. STRANGE KOLLE, M. D.

18-20 West 25th Street, N. Y.

SUBCUTANEOUS HYDROCARBON PROTHESES

Although the subcutaneous employment of oil and liquefied paraffine has been known for some years, particularly by Corning¹ who refers to his use of solidifying oils in surgery in an article published in 1891, no actual application for prothetic purposes was made until 1900, when Gersuny² first advocated the method. In his published report he says that, "if vaseline, which at the temperature of the body has the consistency of ointment, be liquified by heat and by the means of a Pravaz syringe is injected into dilatable tissue of the human body there is produced, at the site where the injection is made, a tumefaction whose volume corresponds to the quantity of vaseline injected. The reaction which results from the procedure is insignificant and the mass appears to rest without change where injected."

This subcutaneous method of vaseline injection he employed in the case of a young girl to correct a saddle or depressed nose. The operation was purely a cosmetic one and was performed on the eighth day of May, 1900, with a very satisfactory result.

From the time of the appearance of Gersuny's paper, "Ueber eine Subcutane Prothese," a number of operators such as Halban,³ von Frisch,⁴ Kapsammer,⁵ Delange,⁶ Rohmer,⁷ Stein⁸ and others, began to follow the method with gratifying results.

Pfannenstiel,⁹ shortly after, claimed that the injection of vaseline was not wholly without danger and that pulmonary embolism had been observed by him subsequent to its use. Moszkowicz¹⁰ denied the possibilities of such danger, although at this date it is quite evident that there are many objections to the sole use of sterile vaseline for all subcutaneous cosmetic purposes where such protheses might be indicated.

Eckstein¹¹ on the 24th day of July, 1901, rehearses these objections and advocates the use of "Hart paraffine," or paraffine with a melting point of 57-60°C. (140°F.). His method was taken up by Broeckaert,¹² Baratoux,¹³ Brindel,¹⁴ Watson Cheyne,¹⁵ Walker Downie,¹⁶ Leonard Hill,¹⁷ Lake,¹⁸ Scanes Spicer,¹⁹ Karewski,²⁰ and other prominent surgeons abroad, and by Parker,²¹ Harmon Smith,²² Hamilton,²³ Quinlan,²⁴ Connell²⁵ and others in the United States.

Drs. Lynch²⁶ and Heath²⁷ were the first American physicians to place themselves on record in the employment of the method of Gersuny for the correction of nasal deformities.

Each of the operators employing the now so-called Gersuny method, advanced their individual ideas and improvements in the art, and those of distinctive merit will be considered later by the author who has employed both methods from the time of their incipency.

The method of procedure in the injection of vaseline or paraffine is practically similar, except for the various ways in which the paraffine of different melting points is rendered liquid.

INDICATIONS

The indications for the Protheses of either method are the same, except where the author advocates the use of either one

or the other or a combination of the two from an experience with over five hundred personally conducted cases.

The advantages of the Gersuny method is that the operation is practically painless, causes no scar if properly performed and corrects a deformity that could not be overcome otherwise in some cases, while in others it would entail not only difficult surgical interferences, but subsequently unsightly cicatrices that would render them more objectional than the very defects which were intended to be corrected.

This is particularly true in the cosmetic correction of depressions about the forehead resulting from direct violence or frontal sinus operations, for obliterating habit furrows, or frowns, between the eyebrows; also to restore the symmetry of the face in hollows of the cheek due to the removal of malignant growths, the maxillæ, or when caused by facial hemiatrophy or a congenital or long-acquired sinking in of the cheeks; while it may also be employed with excellent result to prevent post-operative adhesions about the face after mastoid operations and even to restore the form of the breast after operation for malignant disease and the raising of smallpox pits.

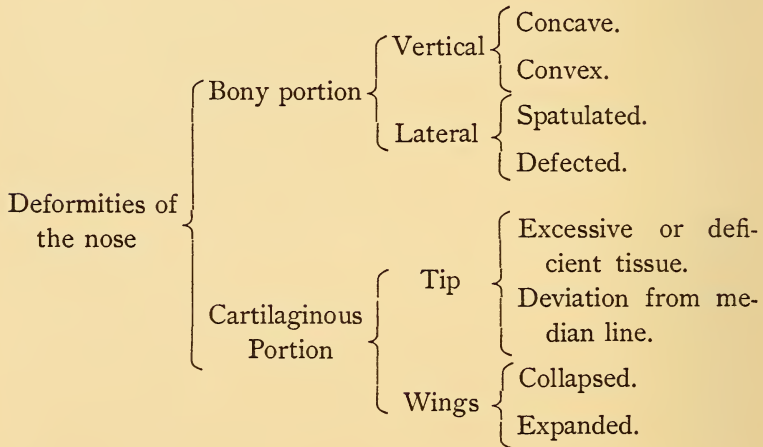
Numerous other uses may be mentioned, such as elevating an undue depression at the root of the nose, raising sunken furrows below the eyes, obliterating naso-labial folds, angular droops about the chin, rebuilding weak or pronounced oval or peaked chins, filling hollows about the neck and shoulders, and in fact anywhere about the body to restore the contour.

In correcting the deformities of the nose, whether congenital or acquired, this method has met an urgent and most useful demand, so much so that many rhinoplastic operations of ex-

tensive delicacy have been thrown aside for this simpler, rapid and gratifying means of surgery.

Not only has it been employed to restore the nasal line in saddle noses, but also in many other deformities of that organ which do not require the removal of superabundant tissue.

According to the appended classification of nasal deformities, given by Roe,²⁸ it will be seen that many faults of that organ may be overcome by the method.



From the above arrangement, and taking each division separately, the author enumerates the applicability of the subcutaneous prosthesis, adding such as are not included in the above.

1. **Vertical concavity.** An over-marked depression at the site of the bony structure and about the root of the nose.

2. **Lateral deficiency of form about the root of the nose ex-**

tending downward as far as the inferior borders of the nasal bones.

3. Median anterior vertical concavity or saddle nose involving the middle third, otherwise the inferior and superior sections.

4. Deviations of the cartilaginous structure about the middle third of the nose, either unilateral or bilateral.

5. Deviation of the lobule.

6. Deficiency of the lobule.

7. Lobular cleft.

8. Subseptal cleft.

9. Collapsed alæ, unilateral or bilateral.

10. Retraction of subseptum.

In these ten subdivisions much can be done to bring about a normal appearance of the nose.

PRECAUTIONS

In selecting a case for subcutaneous injection the operator must well consider the methods to be employed, his successes with such methods, the importance and gravity of the operation, the condition of the patient, the extent of the deformity, the peculiarity of the patient and, particularly, the state of mind of the patient.

While at this date of the use of this method of beautifying parts of the human face we may feel certain of the happy outcome of an operation undertaken by the operator, he must not lose sight of the hypercritical person upon whom the work is to be done; even with an outcome gratifying in the extreme from a surgical standpoint, the patient will insist, and that in 80% of

all cases, to still further improve them in spite of the fact that a normal appearance has been attained, often leading the operator into doing what he should not do, and eventually undoing his own excellent efforts.

The author does not mean to imply this as a weakness on the part of the surgeon, but cannot impress too deeply upon him the unreasonable demands of a person insanely bent upon having the alabaster cheek ideal of the poets, the nose of a Venus, the chin of an Apollo, the neck of swan-like form, etc.

The patient believes it lies in the power of the cosmetic surgeon to do with their malformations as a sculptor would model in clay and will insist upon gaining their ideal beyond all reason.

Let the author warn the operator against the "beauty cranks," especially of those who are just about to engage in great theatrical ventures, circus performances or "acts," and very desirable marriages. These are patients who are not only difficult to deal with, but the first to harm the hard-earned, well-deserved reputation of the surgeon and to drag him into courts for reimbursement for all kinds of damages, especially backed up by events, losses and sufferings largely imaginable and untrue and oftentimes entirely impossible.

In all cosmetic surgery this branch is the most dangerous from that point of view; therefore the operator should take his case well in hand, proceed with an unshakable determination and give the patient to understand his position, even to explaining what disappointments there might be and what dangers, if any, he might look forward to. The author believes it no unjust demand to have an agreement made with the one to be treated in which these matters are fully considered. Such an

arrangement will save him much worry and will tend in the majority of cases to keep his patient satisfied.

On the other hand, the operator should not undertake to do an operation of a cosmetic nature unless he has a fundamental and practical experience of long standing in this branch of surgery and is ready at all times to cope with such post-operative conditions as are likely to arise, which will be described later.

The author has on various occasions been asked to correct the most hideous malformations of parts of the face, particularly the nose, in which surgeons of high standing, both here and abroad, had injected paraffine in liquid form usually under a general anesthetic, the most remarkable being that of a hospital orderly in the U. S. Service, who had been subjected to not only one of such injections to correct a saddle nose under chloroform anesthesia, but to three distinctive operations, with the result of a permanent disfigurement, bettered only by a succession of excisions at different parts of the nose.

Apropos of such cases it may be timely to state that a general anesthetic for the performance of a prosthetic injection operation is never justifiable and should be considered a lack of knowledge on the part of the operator, unless its use be advised by another surgeon in consultation.

The greatest mistake made with this so-called "filling method" has been a desire on the part of the patient or the operator, or both, to complete the work too quickly. Unscrupulous operators have restored a saddle nose or the contour of the cheeks in a few minutes, when it is an established fact that the work should be done slowly, giving time for the injections to accommodate themselves and to organize before others are

attempted. This is not only true of fillings about the cheeks and shoulders, but also of injections about the nose and forehead.

Eschweiler²⁹ particularly emphasizes the advocacy of oft-repeated injections, and the author recommends such rule without reserve or deviation.

THE ADVANTAGE OF THE METHOD

As has been said the advantage of the Gersuny method over other procedures is that it can be undertaken practically without pain, that it is quick, bloodless, leaves no scar and is harmless except under good condition, as will be referred to under separate heading.

While the method entails only the pain of a pin prick a local anesthesia may be employed to overcome this, but never a general anesthetic. The Ethyl Chloride spray, except at very small points of the skin, is not to be recommended because it freezes and consequently hardens the very tissue which should be flexible, the operation being undertaken the moment the needle is inserted and lasting only a few seconds. The hypodermic use of a 2% solution of cocaine, or better Eucaine β , can be employed, but the author sees no advantage in it, as the hyperæmic engorgement following its use obliterates, to a certain degree, the actual extent of the deformity.

It is desirable to obtain the best result to have the skin above the part as free as possible. When closely adherent it should be freed by the careful use of a delicate tenotome, inserted at the point where the injection is to be made, the same opening being used for the introduction of the needle of the syringe. If this opening has been made too large a fine suture of silk should

be employed to bring the lips of the wound together before the injection is made; the needle point, being knife-edged, will not disturb the apposition and will tend to retain the filling if no undue pressure is used as in the case of hyperinjection.

UNTOWARD RESULTS

Connell ³⁰ has tabulated the difficulties and dangers met with in this work as follows :

1. Toxic absorption.
2. Marked inflammatory reaction.
3. Loss of tissue, due to infection and abscess formation.
4. Pressure necrosis, caused by hyperinjection.
5. Sloughing of tissue as a result of the heat of paraffine.
9. Injection into very dense or inelastic structures, or where scar tissue is firmly attached to the underlying and adjacent parts.
7. Sub-injection of too small an amount of paraffine with an insufficient correction of the deformity.
8. Hyperinjection with over-correction of deformity.
9. Air embolism.
10. Paraffine embolism.
11. Primary diffusion or extension of paraffine (when first introduced) into adjacent normal structures.
12. Interference with muscular action of the nose.
13. Escape of paraffine after the withdrawal of the needle or primary elimination.
14. Solidification of the paraffine in the needle, which renders the injection difficult and causes injudicious expedition on the part of the operator.
15. Absorption or disintegration of the paraffine.

16. The difficulty of procuring paraffine at the proper melting point.
 17. Hypersensitiveness of the skin over the injected area.
 18. Redness of the skin over the injected area.
- To those the author would add :
19. Secondary diffusion of the injected mass.
 20. Hyperplasia of the connective tissue following the organization of the injected matter.
 21. A yellow appearance and thickening of the skin after organization of the injected mass.
 22. The breaking down of tissue and the resulting abscess due to the pressure of the injected mass upon the adjacent tissue after the injection has become organized.

Each of the above subdivisions may be advantageously considered individually, to wit :

1. **Intoxication.**—The danger of intoxication may truly be said to be more so due to the unclean or unsterilized matter injected than to the absorption following its employment, although Meyer ³¹ has claimed untoward symptoms found in his experiments from absorption of injections of vaseline in the animal. Taddie and Delain,³² Stubenrath,³³ Straume,³⁴ Sobieranski ³⁵ and Dunbar ³⁶ have corroborated this claim. They injected paraffine of various melting points in the lower animals and observed results therefrom, among which were loss of hair, a reduction of 18% in the body weight in two months and death.

Stein ³⁷ and Harmon Smith ³⁸ refute these conditions and remarked neither systemic nor local untoward results from such injections when paraffine of higher melting points were used.

Jukuff ³⁹ claims that no toxic symptoms result from the ab-

sorption of paraffine injected into tissues are shown, unless the amount be equal to 10% of the weight of the animal. To have this apply to the human as much as ten to fifteen pounds would have to be injected—an amount never required in operations of this nature.

While it cannot be denied that the injected mass becomes more or less absorbed in from two to three months and is replaced by connective tissue, it may be definitely stated that no toxic symptoms are caused directly thereby, except by the employment of an impure product.

2. Reaction.—The reaction following a properly made injection is of a mild inflammatory character. Considerable inflammation points to some fault in the technique or impurity of the injection. More or less oedema of the site and its adjacent area may be noted, associated with slight or marked discoloration and pain of variable degree. The normal reaction following the injection is temporary and does not necessitate treatment or confinement of the patient, who can resume the duties of life fifteen hours after the operation.

3. Infection.—The cause of infection cannot be said to be due to anything but surgical uncleanliness, as it is with any surgical undertaking, and can be overcome by the same means.

The material injected should be thoroughly sterilized by boiling before using. Brœckært⁴⁰ suggests combining an antiseptic with the paraffine and has used guiaform, a combination of formic aldehyde and guiacol in a proportion of 5 to 10%; yet this is of little value when we consider how readily these hydrocarbons can be rendered sterile at high temperatures.

4. Necrosis.—Death of tissue may follow an injection of paraffine when too much pressure has been applied, or when too

much has been injected into the tissue, cutting off the blood supply, or when the injection has been made into the skin instead of beneath it. Again, constitutional disease, such as diabetes or Bright's disease, may superinduce the breaking down of the tissue.

Hyperinjection should and can be avoided by the use of the proper instrument with which the required amount is graduated to a nicety. At no time should an injection be crowded into a dense tissue or where the skin is closely adherent, nor carried so far as to create a blanching of the skin. By carefully injecting the mass this danger should be overcome.

Dense or bound-down areas of skin should be loosened and freed, as has already been mentioned.

If care be exercised and small amounts be injected, in preference to overcoming the defect in one sitting, pressure effects are entirely overcome.

The circulation in the skin over the site of injection should be normal immediately after the operation has been performed, determined by observing the reaction in the color of the skin after delicate digital pressure.

5. Sloughing.—That sloughing of the skin should be occasioned by the high temperature of the paraffine injected is a condition entirely inexcusable. Paraffine of high melting points 58° to 65° C., or the so-called "Hart paraffine" employed by Wolff,⁴¹ liquefying at from 57° to 60° C., are to be used with caution. The author doubts whether the temperature of the paraffine at the time of injection, even in the latter method, is ever beyond 54° C. even if the thermometer registers 60° C. in the liquefying, hot water bath.

By the time it has been drawn into the syringe, which has

been heated by dipping into hot water, and the moment it is injected it has lost several degrees in heat.

It would not be permissible to inject a molten mass of a temperature so high as to scar or burn the tissues, and the best results of most operators have been obtained with such of the paraffine group that become liquified at a temperature of not over 45° C. (112° F.).

The claim of Eckstein, ⁴² that paraffines of low melting points are more likely to be absorbed, has not been substantiated in actual practice, since we now know that any and all of these injections irrespective of their melting points, are absorbed in time, giving place to connective tissue, and that rarely, if ever, is there a true and complete encapsulation or encystment of the mass thus introduced. Even the hard paraffines are split up in time into minute pearl-like particles which are displaced by the growth of tissue arising from the presence of the foreign substance. This is true even in those cases in which the author has introduced by surgical means solid paraffine plates in the cold state.

6. Sloughing Due to Pressure.—When an injection is forced into a dense or firmly bound-down tissue, as into the body of a thickened cicatrix, or about the point of the nose or the subseptum of the nose without first dissecting off the skin above the subcutaneous layers an acute anæmia is at once marked, followed by inflammation and gangrene.

By injecting sterile water into the area thus loosened with the knife a good idea of the thoroughness of the dissection and the possibility of building up the part to be corrected, is obtained, yet in these cases the author has always found more or less difficulty in keeping the injected mass in place for the reason that the divided surfaces tend to unite at their peripheral bor-

ders, crowding the mass upward or to one side or diffusing it in such a way that the result has been anything but satisfactory.

To overcome this it is advisable to inject a smaller quantity than necessary to entirely correct the defect, to mould it out flat and to allow it to organize before more is introduced.

7. Subinjection.—Insufficient injection leading to an under-correction of the defect is a far more desirable condition than hyperinjection and is easily corrected by a repetition of the treatment, even to a third sitting, until the desired result is obtained. Following this rule will give far better results, as has been said, than to be compelled to remove a part of the filling and some of the connective tissue which has resulted therefrom.

8. Hyperinjection.—The injection of too much vaseline or paraffine is one of the most common faults found with operators. In the first instance a tumefaction of the site results which with the production of the tissue which takes the place of part of the filling makes the result very unsatisfactory and requires one or more cutting operations to reduce it. A peculiar fact with these hyperplastic growths is that even though they may be reduced with the knife to a normal size they seem to redevelop again and again, giving both surgeon and patient great concern.

This in the opinion of the author is due to the binding down of the marginal borders, which in the event of partial extirpation, are not injured sufficiently to displace them and that they unite again in their former position. To overcome this it is found best to excise the entire filling much beyond the margins and to apply pressure over the area until perfect union has taken place.

This is best accomplished with a disc of aluminium, bent to

conform to the shape of the part operated, lined with sterilized lint and fixed over the site by strips of Z. O. plaster.

While the hyperinjection of vaseline is not as objectionable as that of paraffine, because of the more ready accommodation and absorption of the mass, it nevertheless leads to diffusion of the material owing to its softer consistency and consequent greater facility in seeking fine avenues of escape, paraffine having the advantage of cooling upon itself en masse, leaving little to escape into undesirable channels after it has once been moulded and set.

Vasserman⁴³ cites a case in which gangrene of the bridge of the nose resulted after an injection of $2\frac{1}{2}$ c. c. of vaseline.

However, when these faults occur they are errors of technique and should be avoided as has been mentioned heretofore.

The removal of such hyperinjected masses by the aid of paraffine solvents, such as benzine, ether, chloroform or xycol applied to the skin above the filling has proved a failure, nor will heat used externally in the same manner remedy evil.

What is left to the operator is to open the skin and, with a small, sharp spoon curette, remove the mass early, before it has become organized, or to excise the new connective tissue and the broken-down filling as mentioned.

When, however, the tumefaction resulting from such hyperinjection is not extensive, as is often found about the chin and at the root of the nose, the secondary deformity can be materially, if not entirely, remedied by electrolysis. A needle or brooch of certain hardness is to be employed, connected with the negative pole of a continuous current apparatus. From twelve to twenty milliamperes are required. The process is similar to that used with the destruction of hair, naevi or moles on the face.

The needle should puncture the entire tumor or penetrate its maximum diameter and be charged with the current for two or three minutes. Several of such punctures should be made at each sitting, the latter being repeated as often as is deemed necessary by the operator. The reaction which follows this procedure is of little moment and these sittings can be undertaken every three or four days.

While this method is liable to leave little punctuate scars at the sites where the needle is introduced, it is nevertheless more satisfactory than the linear scar made with the knife to the use of which the patient may on the other hand object, not to speak of the difficulty and unsatisfactory results usually obtained therewith.

9. Air Embolism.—The fault of introducing air under the skin with the syringe at the time of injection can only be the result of flagrant negligence. Every physician should know enough to hold his syringe in an erect or vertical position and to expel the air above the solution in his syringe, as is done with any hyperdermic injection.

Air embolisms are also occasioned by a careless filling of the syringe with the hydrocarbon in a cold state, as the material is now generally used, and while the dangers of such emboli are very much exaggerated they should not be permitted, when by the pouring in of the liquefied material the syringe can be filled evenly.

Practically there is no harm done by the injection of air under the skin, yet it elevates the skin at the site of the defect and hinders the surgeon in accomplishing the best results.

These emboli cause a bulging up of the skin for the time being and may occasion more or less pain to the patient, which passes

away in ten or twelve hours leaving the parts as injected except for such reactionary symptoms or œdema already referred to.

10. Paraffine Embolism.—The creation of an embolism is invariably due to an injection of the foreign substance directly into a blood vessel. This condition is one of the most objectionable, if not the most dangerous factor associated with the subcutaneous injection of any foreign matter, be it a liquid substance, as, for instance, an oil; many cases have been placed on record where they have been observed after the introduction of even paraffine of high melting points, when introduced under the skin in hot liquid state. Consequently the use of vaseline liquefied by the aid of heat is especially liable to give rise to such condition.

Pfannenstiel⁴⁴ cites a case wherein he injected paraffine in which the patient was at once attacked with violent coughing and for three days exhibited symptoms of grave nature, such as pain in side, intense dyspnoea, acceleration of the pulse, hyperthermia, cyanosis of the face, hemoptysis, violent cephalalgia and vomiting—all indications of pulmonary and cerebral embolism. The injection in this case was one of 30 c. c. of paraffine, with a melting point of 45° C. The symptoms as mentioned continued for about one week, gradually subsiding and followed by recovery.

Kapsammer⁴⁵ has also noticed such symptoms. Leiser⁴⁶ after injecting vaseline to correct a saddle nose noted an immediate collapse of the patient which was obviated only by the hypodermic use of ether and the resort to artificial respiration. When the patient returned to consciousness, he was found to be entirely blind in the right eye, the eye before the operation having been known to show only a pronounced astigmatism.

Kofman⁴⁷ cites the loss of a patient from the injection of 10 C.C. of paraffine for vaginal prolapsis. Moskowicz⁴⁸ observed two cases of pulmonary embolism treated in the same manner stating that an alarming dyspnoea continued for several hours.

Especially have cases in which the injections of paraffine were made sub-mucously for the correction of atrophic coryza shown embolic tendencies. This is especially true when paraffines of high melting points have been employed, as in the case of Pfannenstiel in which instance the condition of the mass permitted of freer absorption or the high temperature caused a coagulation of the blood in the veins, leading to thrombosis and embolism, and when the amount of such an injection is so large as to prevent cooling and hardening in the normal space of time added to the quantity and associated at the same time with consequent pressure, predisposing to absorption or dissemination, especially if the injection be made into parenchymatous instead of the subcutaneous tissue.

Comstock⁴⁹ in his experience on animals, states that, "in all cases in which paraffine was used at 102° F. the animals died within two weeks' time, hence the specimens at that temperature are limited (death being by thrombosis). In all other cases with the higher melting point 110°F. no unpleasant results were experienced."

Hurd and Holden⁵⁰ have observed a patient who had previously undergone two injections of paraffine for the correction of a depression in the upper part of the nose. A third injection was advised and made under the same conditions as the first, except that no cocaine anesthesia was employed, the paraffine being at the same temperature as before.

The moment the injection was made complete blindness in the right eye resulted, while a small ecchymotic spot appeared at the site of the needle insertion in the skin. Half an hour later an examination of the eye showed the right pupil dilated and inactive light stimulus, the patient being unable to distinguish light from darkness. Ophthalmoscopically the lower branch of the central retinal artery and its subdivisions were found to empty and in a state of collapse, evidenced by their pale appearance. The upper branch of the same vessel was found to be poorly filled.

The authors endeavored to remove the embolism to a collateral branch of the artery by the use of amyl nitrate, digitalis and pressure on the globe of the eye, with no effect. Some hours later œdema of the retina appeared, followed by permanent loss of sight. The same authors have observed several cases of pulmonary embolism result from the injection of paraffine.

It is also a fact that injections of the nature being considered while not causing immediate embolism may do so as a result of phlebitis caused by a direct injection into the vein or over or upon it in such a way as to cause irritation.

Mintz⁵¹ reports a third case of amaurosis following a paraffine injection. The latter was made to correct a saddle deformity caused by syphilis. Three minutes after the injection the patient complained of pain in the left eye which was followed by total blindness, vomiting and a pulse of forty-eight. Several days later there appeared symptoms of venous congestion in the orbit, paralysis of the ocular muscles, comeal cloudiness and exophthalmos a small gangrenous spot appeared at the site of the injection.

Brœckært⁵² observed a case of facial phlebitis, followed by pulmonary infarction. Brindel⁵³ cites a case in which he observed a hard line of considerable extent and painful to the touch, extending from the inner angle of the eye to the angle of the eye, where it deviated towards the root of the nose and terminated at the origin of the eyebrow.

De Cazeneuve⁵⁴ made an injection and on the following day noted that the right cheek had increased considerably in size with an elevation of temperature in the part. Two days after under the right eye and to the right of the nose the whole cheek was red, hot and much distended, giving the skin a glazed appearance. Palpation was extremely painful. A hard line could be made out extending from the inner angle of the eye outward and downward under the lower eyelid and terminating in the center of the œdematous cheek. The phlebitis in this case resulted without the development of an embolism.

After a careful study of the causes of such embolisms we come to the conclusion.

1. That the injected mass should not be heated above a certain melting point.
2. That hyperinjection should at all times be avoided, particularly with paraffines of high melting points.
3. That the injection should be made subcutaneously not into parenchymatous tissues, and
4. That a puncture of a vein or the introduction of the injected mass into a vein should be avoided.

In the consideration of the first two causes the author advocates using injections of low melting points only at all times, in fact from his experience with over two thousand subcutaneous injections he relies entirely upon such paraffines or hydrocarbon

mixtures as are semisolid at 70° F. appearing as a white cylindrical thread from the needle of the syringe as pressure is applied.

With such a preparation and a careful introduction of the needle as described later and with the injection of an amount much less than that needed to correct the deformity and proper digital compression on the blood vessels and about the site of the injection embolism is practically impossible.

The avoidance in the third instance is self-evident and it is to the fourth fault and cause that we must pay particular attention.

Stein⁵⁵ says that all that is necessary to avoid puncturing a vein is to first introduce the needle alone under the skin and to attach the syringe only when it is found no flow of blood results from the puncture thus made.

Freeman⁵⁶ and the author add to this by advocating the use of a somewhat blunt pointed needle instead of the extremely sharply pointed knife-edged needles usually furnished with syringes intended for this purpose.

11. Primary Diffusion or Extension of Paraffine.—The spreading of paraffine into normal tissues about the site to be corrected by prosthetic injection is a fault due principally to a careless use of the syringe. The employments of an improper syringe in which the amount to be injected cannot be graduated or controlled will be considered later—the result with such being hyperinjection. In this event when the anterior line of the nose is to be restored, the mass is liable to find its way into the loose areolar tissue of the infraorbital region; in correcting a nasolabial furrow the mass is pushed upward or is forced into the tissue of the cheek above—it aggravating the trouble; in obliterating a

frown it travels upward toward the margin of the scalp giving a median prominence to the forehead that is found to be very difficult to correct ; in injections about the mouth the mass moves down upon the chin or accumulates at the angle of the jaw ; in correcting the creases beneath the chin it seeks the sides of the neck, even travelling to the superior border of the clavicle at its sternal third. Many other forms of such diffusions can be mentioned directly due to primary diffusion the result of hyperinjection.

Enough has been said of the danger of hyperinjection, yet even with a proper amount of the injected mass this distention may be observed. To avoid this the operator, or his assistant, should compress the margins of the site of the injection with his fingers firmly applied, as for instance in the injection of the root of the nose pressure should be made at both inner canthi and over the tissue just above the root of the nose and beneath the finger tips.

Downie⁵⁷ advocates the use of celloidin in the correction of a saddle nose as follows : He paints a band of celloidin or colodion down each side of the nose limited by the line of junction with the cheeks and another band across the root of the nose. These painted on bands he allows to dry and contract for fifteen minutes before undertaking the injection.

The contraction of these bands, prevents to a certain extent the spreading or extension of the liquid paraffine into the cellular tissue about the eyes, yet experienced digital pressure is at all times to be preferred.

If a liquid paraffine or hydrocarbon mixture or vaseline is used, the immediate use of ice cloths applied to the part as digital pressure is removed, is advisable to aid in the rapid har-

dening or setting of the injected mass before the tension of the tissues over and about it, might influence it. With semisolid injection this is not necessary, except in the subsequent treatment as will be considered later because the mass, unless of too soft a consistency, as for instance vaseline will practically remain as injected and moulded.

Vaseline when injected into tissue where there is tension would naturally be forced out of position and shape and should not be used except in combination with a paraffine of a melting power high enough to give the proper consistency to the former.

12. Interference with Muscular Action of the Wings of the Nose.

—That nasal respiration may be encroached upon as a result of injecting paraffine about the nose has been observed by Alter.⁵⁸ He points out that during nasal inspiration there is a tendency for the alæ to contract upon themselves or to move inward decreasing the lumen of the orifice and that in the normal state this movement is counteracted by the action of dilator muscles of the alæ, that is the dilator naris anterioris, the pyramidelis nasi and the levator labii superioris alæque nasi and that this muscular action is interfered with owing to the pressure of the paraffine upon these delicate structures and resulting in more or less permanent collapse or indrawing of the alæ during inspiration. He observed considerable interference with inspiration in a case cited in which an injection of paraffine had been made.

To avoid undue pressure upon the structures referred to it is advised to have an assistant place a thumb into each nostril and the index fingers without and above the alæ in such way that the tips of the fingers may be enabled to exert the necessary pressure over the injected mass into these structures, and to maintain this pressure until the mass has been properly moulded

and set. Connell⁵⁹ advises inserting the little fingers into the nostril to prevent an encroachment on the lumen of the nasal canal.

The above applies particularly to those cases where injections are made into the anterior lower or lateral third of the nose, as for instance in overcoming slight depressions in the anterior line, immediately above the lobule or in a low unilateral deviation of the nose.

13. Escape of Paraffine after Withdrawal of Needle.—When the injected mass employed is of a semisolid consistency as heretofore advised, it is hardly possible for the mass to be forced out through the opening of the skin made by the introduction and withdrawal of the needle, unless there be an unwarrantable immobility of the skin above the site to be injected. The latter should be corrected before injection.

The mass after having been moulded in the shape desired may be further hardened and set by the application of ice cloths or spraying with ether before the needle is withdrawn from the skin, yet this is hardly necessary and the author advises against the practice for the reason that pressure of the needle prevents proper and free moulding of the mass and renders the tissue liable to further injury by scraping its point to and fro subcutaneously adding to the extent of the wound and the dangers of infection and repair.

The skin immediately around the needle hole, after withdrawal of the needle, may be gently smoothed out with the dull rounded metal handle end of the bistoury to free the interdermal canal of any foreign matter.

The skin about the needle hole is then gently washed with a 50% solution of hydrogen peroxide, dried with a sterile cotton

sponge and the opening sealed with a drop of collodion. Subsequent treatment of the parts will be considered later.

14. Solidification of Paraffine in Needle.—This occurs only when paraffines of high melting points are employed in liquid form in the syringe, and is due to the rapid cooling of the paraffine in the small metallic canulæ, or needle, wherein it sets more readily since the volume contained therein is very small, often not more than two or three drops.

This cooling establishes a plug-like formation in the distal end of the needle which prevents a proper use of the syringe, often breakage, and when suddenly liberated by an extra pressure on the piston rod causes a rapid discharge of the contents of the syringe to an extent not desired with the result of hyperinjection.

This fault was one of the most annoying in the early days of such injections when syringes of ordinary pattern, such as the Pravaz, or those built like the ordinary hypodermic were used. It was not unusual to have the paraffine cool in the needle so quickly between the latter in the flame of an alcohol lamp, that the syringe became unmanageable and broke in the hands of the operator. Since that time new and more useful syringes have been introduced by various operators which overcome this difficulty, yet with them, too, come the employment of semi-solid paraffines or mixtures thereof. Yet as some authors insist upon using paraffines of high melting points it may be well to rehearse their methods of overcoming this annoying intra-needle solidification.

Eckstein⁶⁰ surrounds the syringe and needle shaft, except the tip of the needle, with a rubber tubing as shown in Fig. I, to act as an insulator and thus, for a time at least, keep the preparation liquid. Before filling the syringe he heats it by sev-

eral immersions in and internal washings of hot sterile water. To prevent the paraffine from setting in the exposed tip of the needle he draws into the filled syringe a few drops of hot water which are injected into the tissues, causing no objection to the method.

Paget⁶¹ and Harmon Smith⁶² warm the needle in hot sterilized or even boiling water. Previous to this Smith cools the

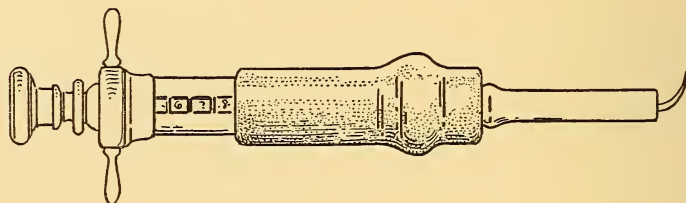


FIG. I. Eckstein's Insulating Sleeve.

contents of the syringe drawn into it at a temperature of 120° F. by immersing the latter in a bath of sterilized water at a temperature of 80° F.

From the above it will be noted that Smith advocates using the injections in semisolid state being ejected in a thin, cylindrical thread. A syringe of special construction as referred to later is of course required for such work.

Quinlan⁶³ has invented a so-called paraffine heater as shown in Fig. II, in which the paraffine is kept in solution by the syringe being surrounded by a continuous flow of hot water. A plain and very objectionable syringe is shown in the illustration and while the preparation in the syringe is thus kept in a liquid state the solidification in the needle is not overcome.

Downie⁶⁴ winds fine platinum wire about the needle through

which he passes the current from a storage battery to keep the needle hot yet such an arrangement is obviously difficult of manipulation and when paraffines of high melting points are employed it is quite likely that a plug is formed in the exposed point of the needle.

Karewski⁶⁵ has introduced a syringe having a jacket through which hot water is allowed to circulate, while similar instruments have been originated by Pflugh⁶⁶ and DeCazeneuve.⁶⁷ None of these overcome the difficulty in question.

Viollet⁶⁸ went even further by inventing a syringe surrounded with a coil of resistance wire, heated by an electrical current, and Delangre,⁶⁹ Ewald⁷⁰ and Moszkowicz⁷¹ use special thermophorm sleeves over the syringe proper, all however offering the same objection in the exposure of a part of the needle in which temperature of the liquid must necessarily be lowered, or be low enough to cause plugging, the very fault for which all these modifications have incidentally been urged, as the greater amount of paraffine in the syringe itself is as a rule large enough to retain sufficient heat to permit of its ejection, if the injection is made as expeditiously as possible.

The objection of the setting of the paraffine in the barrel of

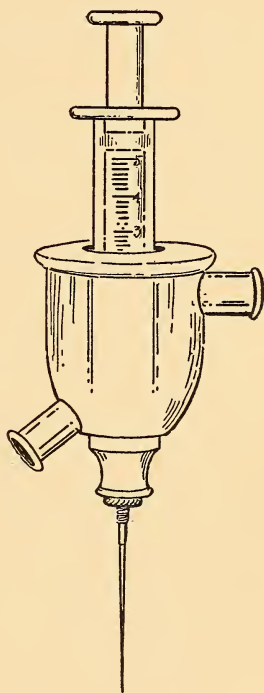


FIG. II. Quinlan's Paraffine Heater.

the syringe has never hampered any operator, the difficulty in these instances having been entirely due to the obstruction offered its ejection by the thread-like plug obstructing the metal-canula before it; the barrel being glass retains its temperature more readily than the thin metal needle, hence the difficulty.

That all prothetic preparation of the nature in hand should be placed in the barrel of the instrument in liquid form is essential, in that the syringe is thus filled to its required height evenly, and devoid of air spaces, yet in the light of the best and most successful results the mass should be allowed to cool and be ejected in semisolid state from a specially constructed instrument to be described later.

With such method it is impossible to have an occlusion of the needle at any time and the objection of sudden outbursts of unknown and undesirable quantities of the mass is entirely overcome.

15. Absorption or Disintegration of the Paraffine.—The question of the ultimate disposition of paraffine, injected subcutaneously for any purpose, has been an extensive one in which many operators have taken part.

Gersuny⁷² at first claimed an encapsulation for the injected mass of vaseline, which he states was not taken up by the lymphatics but remained in situ as an inert, non-irritating body. Shortly after it was shown that the encapsulated mass soon became ramified by newly formed, fine bands of connective tissue which developed more and more in the part until the entire mass had become displaced by this tissue with an eventual consistency of cartilage.

Eckstein⁷³ claims that at first a capsule of new connective

tissue encloses the injected mass (Hart paraffine) a few days after the latter is injected, which can be easily stripped away from the encapsulated matter several weeks or months after, showing a smooth inner wall, the encysting capsule showing a decided lack of blood vessels, proving histologically its relation to the structure of cicatricial formation.

In this Eckstein is undoubtedly mistaken. He objects to the ultimate replacement with connective tissue for the vaseline process of Gersuny, when in reality we have begun to realize that such result will follow any hydrocarbon subcutaneous injection unless the latter be made in small quantity into parts of the body which are in constant motion.

The latter is shown with injections of paraffine made into or about the nasolabial fold. The tumor is so small as to be hardly felt by the palpating finger, but soon takes on larger proportions evidencing an encapsulation of some extent or less independent of the encysted mass. That this is true can be ascertained by incising these little hard tumors when the contents can be readily pressed out or evacuated, the mass appearing practically as injected months before.

The same result is shown by Harmon Smith⁷⁴ who made an injection of paraffine (110° F.) into the peritoneal cavity of a rabbit which was killed 22 days later. On examination no sign of inflammation of the peritoneum was found—a fact that seems to prove the nontoxic effect of paraffine—nor were there evidences of the formation of adhesions. The mass had become rounded, had travelled about the abdominal cavity and was found lodged between the liver and the diaphragm.

Comstock⁷⁵ with his experiences of injections of paraffines at high melting points, found that the harder paraffines do not be-

come encysted but become a part of the new tissue, which belief is corroborated by Downie⁷⁶ who introduced paraffine into a carcinomatous breast. Upon subsequent amputation and microscopic examination, there was shown an intimate connection between the ramified site of the injection and the surrounding tissue. The same results have been noted by Juckuff.⁷⁷

Smith⁷⁸ found, that in trying to remove an injected mass of paraffine several months after introduction, the greater part of the mass had become so thoroughly embedded in the meshes of the newly formed connective tissue that it was practically impossible to remove it without including a considerable portion of the connective tissue as well.

Stein⁷⁹ claims also that the paraffine is absorbed, little by little, as it is replaced by the new connective tissue, no matter what the melting point of the introduced paraffine might have been. The mass grows smaller to a degree according to the amount injected; finally at the end of a month or more, the entire mass is replaced by a tissue perceptibly analogous to cartilage.

Freeman,⁸⁰ like Eckstein, claims that encystment of the paraffine occurs soon after the injection, much like that following a bullet or other foreign body in the tissues, but unlike the latter author, that a limited amount of the connective tissue also penetrates the mass which is speedily converted into a solid cartilage-like body.

Wendel⁸¹ believes entirely in the encystment theory, while Hertel,⁸² in specimens removed twelve to fifteen months after injection of paraffine with a melting point of 100° F, found a wall of round cells under various states of inflammation surrounding the masses with fibers of connective tissue traversing

the latter. In the various histological findings he argues that the greater the tissue surface exposed to the injected foreign body the greater the irritation and the larger the smooth paraffine mass the less the reaction, in other words, small masses of the injected mass cause a higher rate of tissue formation while the larger masses have a tendency to encystment merely. He also believes that the harder paraffines require a greater length of time to become absorbed, and that during such time of resorption new connective tissue growth is established continuing to the time of its complete disappearance.

Comstock⁸³ after thorough and extensive investigation with the injection of paraffines of various melting points made at varying times after the injection of such procedures concludes definitely that, "In paraffine we have a substance that will fill in spaces of lost tissue, and not remain entirely a capsulated foreign body, but become a bridgework and, in fact, a part of the new tissue."

Wenzel⁸⁴ after an unsuccessful attempt to overcome a lap-arocele by the injection of paraffine, a year later performed a radical operation of the parts. The excised tissue at the site of the injection showed deposits of the broken up mass of paraffine each being enveloped by a capsule of connective tissue without any signs of ramifying bands and hence decided against the belief of the resultant tissue formation.

Eschweiler,⁸⁵ the latest authority on the above question, after examining microscopically a portion of paraffine injected tissue that had been carried "in situ" on the bridge of the nose for about one year concurs absolutely with the connective tissue replacement belief.

From the foregoing it may be definitely accepted that while

there may be an encapsulation or encystment of the injected mass, be what it may so long as it belongs to the paraffine group, there is always a ramification of the mass by the formation of strands of new connective tissue which eventually in a month or more according to the amount of the mass, develops to a size corresponding to the latter or even beyond the size of the latter as will be mentioned later, and that in all cases the paraffine is ultimately and almost, if not completely, crowded out of the area occupied by the injection and that its disappearance is accountable to absorption.

This absorption, following such an injection, is productive of no harm to the human economy and the new tissue caused to be formed by such injection truly enhances the cosmetic and surgical value of the method in as much as an encapsulated mass of paraffine is liable to displacement, spreading and irregularities should it be subjected at any time to external violence.

Such violence, again, would lead to the irritation and inflammation of such cyst wall causing an undue crowding upon the parts injected and possible gangrene of that part of the wall upon which such pressure was brought to bear, leading to unsightly attachment and ultimate contraction of the skin where bound down by the inflammation, or even evacuation by the absorption of gangrenous material and resultant abscess.

That this absorption or disintegration of paraffine is of no consequence may be proven by all the early cases in which such injections were used. Gersuny's first case having been done May, 1899, shows no diminution of the prothetic site at the end of two years. The same may be said of the hundreds of cases done by other operators.

The greater question in the mind of the author is what will be the ultimate behavior of this new connective tissue.

That the development of this new connective tissue is gradual has been mentioned, some authors claiming a complete replacement of the mass at the end of a month, others from two or three months. Morton ⁸⁶ says that four months time is required before the mass is, more or less, completely removed and replaced by organized tissue. The author believes, however, that the length of time necessary for this replacement not only varies, proportionately with the amount of paraffine injected but that it differs in each case, and markedly with some patients in which the growth or developments of the new tissue did not cease for months and even a year after such injection. This corresponds truly to a hyperplasia and will be considered later.

Time alone will show the ultimate behavior of this new tissue, and while it is reasonable to argue that this newly organized tissue could cause no untoward results, it must be determined whether this tissue will not undergo atrophy and contract, or become susceptible to other changes in time. It is a new tissue practically, and as yet we know nothing of its idiosyncrasies, although its histological nature is determined.

We do not know that irritations, such as surgical interference, will cause it to take on new growth, as evidenced by the attempts of extirpation of unaccountable overcorrections obtained with injections made early in the time of the employment of the Gersuny method, in which the parts practically grew back to their former size or became even larger. This may be accounted for by the fact that most, if not all, of the connective tissue was not removed or points to an active nucleus or several such centers which were not destroyed.

That the growth is not limited by the size of the mass injected is the author's belief, in other words, the replacement of the new tissue is not proportionate to the injection, but that other forces, such as adjacent tissue pressure and presence and outer influences, as for instance the daily massage of the parts with the hands have much to do with the final amount of tissue caused to be developed by the initial stimulus of the injection. Nothing further or definite however has been written on this supposition.

16. The Difficulty of Procuring Paraffine with the Proper Melting Point.

This should not prove an objection to the method, since operators can procure pure and sterilized paraffines of the various melting points from any reliable chemical house.

What the operator should determine first of all is the kind of paraffine he intends to use for subcutaneous injection.

The selection of paraffine of a certain melting point should be influenced by what he has read on the subject as given by authorities of wide experience.

A few cases do not suffice from which to draw conclusions; it is only from a great number of similar operations that a definite form or preparation of paraffine can be decided on.

From the following authorities is shown a variance in the melting points of the preparations used, but by a glance it may be noted that the first division of men, from numbers 1 to 10 inclusive, use paraffines of melting points very near to each other; the latter group, from 11 to 13 inclusive, employ those of the higher melting points.

The former group may therefore be said to utilize the paraffines of lower melting points.

GROUP I

1. Gersuny ⁸⁷.	. . . . .	36-40° C.	97-104° F.
2. Moskowicz ⁸⁸.	. . . . .	36-40° C.	97-104° F.
3. Parker ⁸⁹.	. . . . .		102° F.
4. Freeman ⁹⁰.	. . . . .	40° C.	104° F.
5. A. E. Comstock ⁹¹.	. . . . .		107° F.
6. Walker Downie ⁹².	. . . . .		104-108° F.
7. A. W. Morton ⁹³.	. . . . .		109° F.
8. Harmon Smith ⁹⁴.	. . . . .		110° F.
9. Stephen Paget ⁹⁵.	. . . . .		108-115° F.
10. Pfannenstiel ⁹⁶.	. . . . .		115° F.

GROUP II

11. Brœckært ⁹⁷.	. . . . .	56° C.	133° F.
12. Eckstein ⁹⁸.	. . . . .	56-58° C.	133-136° F.
13. Karewski ⁹⁹.	. . . . .	57-60° C.	134-140° F.

From a glance of the first group the variance of the temperature of melting points is not a great one, practically lying between 102 and 115° F. approximately. When we consider the actual difference in the employing practicability and the effect upon the tissue there is practically little, if any, difference. The only difference between these authorities is that some employ their preparation in liquified form, through the application of heat, while the others employ it in the cold or semisolid form. The choice of such method, from what has already been said, should unreservedly be the employment of a paraffine in the cold or semisolid form at a mean temperature of about 110° F.

This choice would fall upon any one of the paraffines used by the authorities given in Group I.

The objections to the "Hart paraffines" of melting points given in Group II have been sufficiently shown in preceding paragraphs, although a few pointed objections from the various surgeons may not be out of place here to offset the claims and advocacies of those employing the preparation in liquid form at higher temperatures than 110° F.

Paget¹⁰⁰ says, "I am absolutely sure now that Eckstein's paraffine is without any real advantage. It is very difficult to handle; it sets very rapidly; it causes a great deal of swelling and some inflammation and may even produce some discoloration of the skin, and it yields no better results than does Pfannenstiel's paraffine, which melts at 110° F."

Again he says, "the best paraffine is that which has a melting point somewhere between 108 and 115° F. When the paraffine has to stand heavy and immediate pressure, the higher melting point is preferable."

He had up to the date of the latter extract operated upon forty-three cases of deformed noses and "in no case was there embolism, sloughing of the skin or wandering of paraffine."

Paget, however, employs the paraffine in liquified form, and allows cold water to trickle over the nose while the injection is moulded into form. Of this later.

Comstock¹⁰¹ says, "Paraffine must be used where it will be at all time above the body temperature" and further that, "in selecting the melting temperature for surgical uses, it should be that from 106 to 107° F. the best for use in subcutaneous injections, for the reason that it gives a substance firm enough to hold very well its form, especially when confined by the surrounding tissue, and at the same time with a melting point out of the reach of the system at all times."

From this we are given to understand that he uses his preparation in cold form entirely when injecting, but of the melting point mentioned.

The author can see no advantage in using any paraffines of low temperature melting points in liquid form. Here is the very factor of causing embolism reintroduced. Surely a liquid of any kind injected into a blood vessel will give cause for trouble, even if the temperature of the setting of such a paraffine be high or low. The employment of the paraffines of a melting point above 120° F. in cold form is difficult, if not impossible, even with the latest pattern of screw syringe which is quite true, but there is no need of using such paraffine nor any liquified paraffine since any such preparation of about the melting point of 110° F. will serve every purpose overcoming all the objections of the advocates of those using any other.

If a vessel be injected and filled with any paraffine preparation there is danger of phlebitis and thrombosis, the only possible way to overcome it is not to puncture the vessel.

While a preparation injected cold can be more easily governed from without by digital pressure or guidance, what can be said for a hot seething preparation introduced under great pressure?

Furthermore, when paraffine is injected in liquid form, especially when so rendered by a temperature necessarily even higher than the actual melting point, there is danger of searing the entire site intended for injection—a condition inducive to no good and a burning of the skin where the necessary superheated needle enters it, causing a punctate scar, more or less painful during the time required to heal the wound.

With the later knowledge that small amounts should be injected and that such injections should be repeated, it being

known that such method facilitates the production of new connective tissue may we not draw the conclusion that the result obtained by the injection depends not upon the injection per se, but the resultant of that injection, namely tissue production and that this tissue production is the outcome of a stimulus in the form of that injection.

There has not appeared an authority who has claimed otherwise for injections of paraffine hot or cold, while it is true that the use of liquified paraffines at high temperatures have caused all sorts of untoward results while those of lower melting points, in similar form have not escaped objections.

The author has used the cold injection method in over 300 nose cases without a single case of sloughing, embolism or death, and in no case was there secondary diffusion or hyperinjection. The only fault has been the desire on the part of the patient to be finished too quickly which usually leads to a result not as satisfactory as when the injections are made sufficiently far enough apart to allow the formation of organized tissue at the site of injection.

Gersuny's preparation of paraffine, particularly useful for the cold injection method, is made as follows: A certain amount of cold paraffine melting at about 120° F. and white cosmolin or vaseline, melting at about 100° F. are mixed by being heated to liquification. The bulb of a clinical thermometer is then coated with the cooled mixture of paraffine which is then placed into a hot water bath the temperature of which is gradually raised until the paraffine melts and floats upon the surface of the water. The water is then allowed to cool and its temperature noted just as the oil-like liquid paraffine begins to look opaque, which marks the melting temperature point of the mixture.

Should this be found to be too high more vaseline is added, or vice versa until the desired quantity of both is known.

This method of preparation is however a tedious and awkward one and can be readily improved upon by mixing certain known quantities of the one with the other after the first experiment.

The author recommends the following formula for the preparation of a mixed paraffine which he has found serviceable and satisfactory for use with cold process injections and employed by him for the last four years.

$$\mathbf{R} \left\{ \begin{array}{l} \text{Paraffine (plate, sterile)} \quad \mathfrak{z} \text{ ii} \\ \text{Vaseline alba (sterile)} \quad \mathfrak{z} \text{ ii} \end{array} \right.$$

The two are placed into a porcelain receptacle and melted in a hot water bath to the boiling point, then thoroughly mixed by stirring with a glass rod and poured into test tubes of appropriate size and allowed to cool. Each tube is sealed properly with a close fitting rubber cork which may be coated with a liquid paraffine without, including the neck of the tube and put away for later use.

Since 1905 the author has used an electrothermic heating device in which the paraffine mixture is prepared. The apparatus is made up of a metal pot set into the resistance coil and is shown in Fig. III.

This instrument overcomes the complications of the water bath and the burning or browning of the paraffine mixture so commonly found with ordinary methods. The temperature of the resistance coil within the heating chamber being controlled by a small rheostat at will.

Before using, the contents of each test tube thus prepared are reheated to sterilization and poured into the barrel of the syringe

to two-thirds of its length, the piston introduced and screwed down into position ; the syringe being placed to one side until its contents have been cooled, or the entire instrument is immersed in sterilized water at about 70° F. until the paraffine mixture has set or becomes uniform in consistency, which takes about 5 minutes.

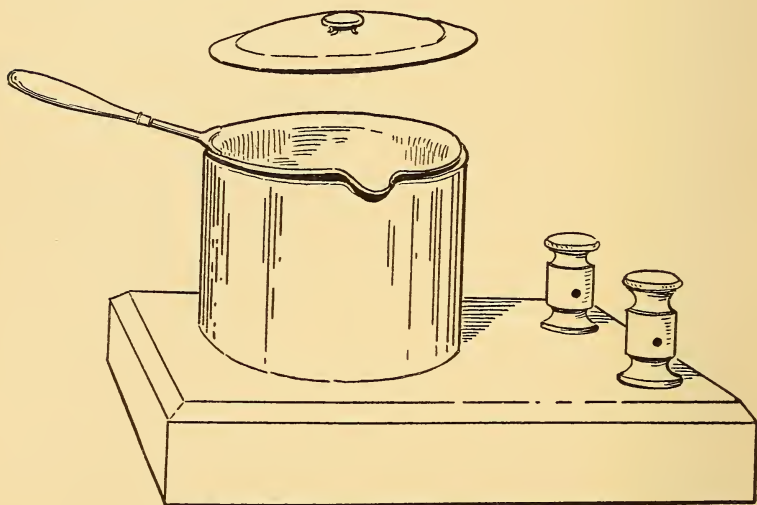


FIG. III. Kollé's Electric Paraffine Heater.

Upon screwing down the piston the mass will be found to issue from the needle as a white, cylindrical thread and is ready for use in this form.

Harmon Smith¹⁰² has had such a paraffine prepared which has a melting point of 110° F. This can be purchased in the market in sterile sealed tubes ready for use. The contents of

these tubes should however be resterilized at the time of employment.

The same author prepares this paraffine of 110° F. melting point by mixing sufficient petroleum jelly (evidently white vaseline) with the commercial paraffine melting at about 120° F. to bring the melting point down to 110° F. He claims that making such a mixture is a difficult matter, since a plate of paraffine will have various melting points, one corner melting at 120° and the opposite as high as 140° F. He advises having the mixture accurately prepared in large quantities and dispensing it in test tubes of one-half ounce capacity as now found on the market. The mixture is poured in hot liquid form into these test tubes which are then sealed with wax and placed on a sand bath whose temperature is raised to 300° F. to insure sterilization.

The latter author has devised a neat paraffine heater shown in Fig. IV.

Of this he says, "To insure still further the sterilization of the paraffine, I have devised a tin (nickle plated) receptacle supported on an attached tripod, which raises the bottom an inch from any plane surface on which placed and is closed with a detachable lid. This arrangement prevents the paraffine from burning or browning. Into this I pour the paraffine from the test tube, after melting, and place this receptacle into a sterilizer, or any ordinary boiler—surround it almost entirely with water and then boil. After I have boiled it for a few minutes, I remove the receptacle and permit it to cool until the paraffine therein is about 120° F. I then draw it up into the syringe which has been sterilized in the same boiler with the paraffine. When sufficient is withdrawn, I evacuate the air bubbles from

the syringe by pressing the piston upward and run my set screw into place. Some two or three minutes are now allowed for the paraffine to assume equal consistency throughout and to cool down to a semisolid state. When the paraffine reaches this consistency it may be kept many hours ready for use, at the temperature of the room, if only the precaution to warm the needle is taken each time before attempting the injection."

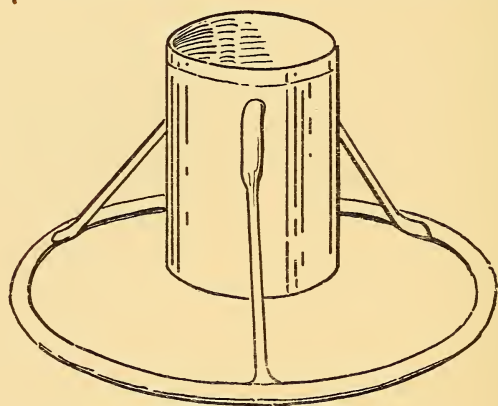


FIG. IV. Smith's Paraffine Heater.

17. **Hypersensitiveness of the Skin.**—A permanent hypersensitiveness of the skin over the site of a subcutaneous paraffine injection has never been definitely shown. While it is true there is some pain and feeling of stress and fullness over and about such area, immediately after the operation, this has subsided in about twenty-four hours in the average case, except in those where a very hot liquid paraffine and of large amount has been injected, when several days are required to overcome these symptoms.

Smith¹⁰³ claims a numbness over the site of the injected area which soon passes away, but this is perhaps more a feeling of fullness rather than one of anesthesia.

The author has observed, however, in several cases a period of extreme discomfort, fullness and cephalgia in cases of subcutaneous injections about the root of the nose. Peculiarly these attacks appear only after the filling has become organized that is after the connective tissue has displaced the paraffine. The secondary tumor in such cases appears to be slightly larger superiorly than the original size at the time of injection.

The irregularity of these attacks, with œdema of the forehead and slight puffing of the upper eyelids, points to a disturbance of the circulation and is undoubtedly due to pressure on the angular vessels, and the venous arch across the root of the nose. The symptoms usually appear in the early morning and moderate towards night, reappearing again the next morning or not again until the next attack which may be expected at any time.

This condition of affairs is an unfortunate one, since we cannot look to the avoidance of the trouble nor foresee it at the time of operation. In one case the symptoms did not develop until nearly two years after the injection was made and became so troublesome that the only relief had was by opening the skin of the nose laterally and excising as much as seemed necessary of the newly formed connective tissue with a fine pair of curved scissors. None of the injected matter was discovered except two fine scale-like discs of glistening paraffine of a diameter of one-sixteenth inch. These were evidently all that remained of the injected mass and were undoubtedly held in the innermost meshes of the new tissue. Immediate relief followed the oper-

ation but no appreciable difference in the size of the tumor could be noticed.

Cold applications or ice cloths relieve the temporary pain following an injection of paraffine but in most cases this is rarely necessary except in extremely nervous and expectant patients.

On the whole the author believes the secondary neuroses and circulatory difficulties are now practically overcome by the more conservative use of the matter to be injected, coupled with a repetition of the injection of smaller amounts at each sitting and not repeating the same until the first has become organized.

18. Redness of the Skin.—Redness of the skin following an injection of the nature under consideration was one of the early objections made by various operators.

That redness more or less permanent has been found in many cases in which these injections were made is true, but such redness was found particularly when the injections were those of liquid paraffine of high melting points and in which the operator was over-zealous in bringing about an absolute correction of a deformity, with the result that when the paraffine had been moulded and set, it was generally pinched or shaped up or outward thus causing a great deal of pressure upon the circulatory vessels of the skin.

The redness in such cases did not appear until several days after the operation becoming worse gradually instead of better even in spite of the efforts to reduce it by external applications. Not unusually, in the permanent cases, distended capillaries can be seen in the skin resembling the condition in acne rosacea chronica, especially when the injection had been made to correct a saddle nose.

Smith¹⁰⁴ says, "Redness is present in a good many cases.

I have seen a case in which the redness lasted over a year, but it gradually disappeared. There seems to be a tendency on the part of nature to take care of a foreign body, and I think the reinforcement of connective tissue that grows into this mass requires an increased blood supply, and later, when the blood supply is no longer necessary the redness will disappear."

The latter is true where the hyperæmia is either acute or subacute, but in chronic cases where the capillaries have become distended and show plainly there is little to be hoped through the effort of nature.

Eckstein,¹⁰⁵ the advocate of "Hart-paraffine" method of high melting point, states that a redness of the parts develops a few days after the injection that disappears after a time, but that this redness is more marked and of longer duration when the injections are made intracutaneous instead of subcutaneous.

These injections should be made subcutaneous in all cases and there is no excuse for deviating from this method.

With the use of semisolid and cold paraffine mixtures as heretofore advocated, redness rarely if ever follows the injection unless undue pressure has been made, in which case necrosis is more liable to follow unless the adjacent tissue will gradually allow the mass to become relieved by a change in form and position.

Such subsequent hyperæmias are not now as common as when the injections were at first attempted and the author may say freely that they never occur when the proper method and material is used.

Paget¹⁰⁶ says: "In a few cases—but only in a few—some reddening of the skin has followed the injection, and in a few this has been very slow to fade.

“The few referred to are of a record of twenty-two nasal cases but no data is given whether the operator used paraffine of high or low melting points. F. Connell found that redness in that case continued for a year diminishing very little in that time. It appeared on the second time after the operation for a correction of a saddle nose and remained stationary for about one month. Twenty drops of paraffine were injected. It very gradually increased, so gradually in fact, that there is still a distinct reddened area over the bridge of the nose. On pressure this redness will disappear, but returns immediately after the removal of the pressure. A few dilated and tortuous capillaries course their way over the area. The condition is still present fourteen months after the injection.

“There has been practically no change or decrease in the redness during the last six or seven months, it is not as marked as it was during the first few months, but still requires the profuse application of face powder in order to prevent her nose from being conspicuously red.”

The above case has been cited because it is typical of such condition and while the amount as stated was quite small, one is almost nonplused for an explanation of the result, yet it undoubtedly must have been due to a close attachment of the skin to the underlying structures necessitating pressure which is known to cause it.

However, it is possible to have such redness develop weeks or months after the injections are made. In such cases it is not due to the primary pressure of the injection but to that of the newly developed tissue which has taken its place but which is slightly overdeveloped for the same unaccountable reason already referred to.

Almost every surgeon who has used this method of restoring the contour of parts of the face has observed redness, more or less permanent, follow the method used but in most cases liquid paraffine of high melting points had been forced into the tissues at great pressure.

In one case, that of a southern operator, the entire tip of the nose had become injected by primary diffusion or direct filling.

It became inflamed immediately after and some weeks later, when the swelling had subsided, the lobule was found to be very hard, tense and extremely red. Two years after the author saw this case and the tip of the nose still appeared like a red cherry with numerous capillaries showing over its area, while the rest of the nose although much broadened by secondary displacement of the paraffine was natural in color.

This proves that as the pressure was relieved by absorption and displacement, the tissue took on a normal appearance, whereas in the lobule of the nose, where there was no relief from the pressure nature could do nothing to relieve the inevitable result.

In cases where the redness is suspected it may not be too late, a day or two after the injection, to remould the mass into such form as to relieve the acute tension.

If the redness develops early, cold applications of an anti-septic nature or ice cloths can be used to advantage. Anti-phlogistine or other similar preparations applied externally give good results.

Later ichtyol, 25% solution, may be applied; acetate of alumen in saturated solution seems to do well. Some operators apply hydrogen peroxide, but it gives only temporary benefit. When the capillaries have become distended and the redness is prac-

tically chronic the vessels should be destroyed with a fine electric needle using about 20 milliampères—direct current.

Sometime when the redness is acute and seems to persist depletion of the part does some good. This is done by nicking the skin here and there with a fine bistoury and allowing the part to bleed freely. Care should be taken not to puncture the skin too deeply so as not to allow the injected mass to escape.

In some cases it is allowable to open the filled cavity early and remove enough of the filling to overcome the difficulty, injecting later, after the filling has become organized to make up the deficiency.

When the redness is secondary, that is when it develops after the connective tissue has replaced the paraffine, it is best to open up the part and excise enough of the tissue to overcome the pressure.

In a case where the author injected for a deep furrow in the forehead with a cold semisolid paraffine mixture a secondary redness developed three months after the injection had been made, no redness having been noticed in the meantime. There was more or less swelling for two or three weeks undoubtedly due to pressure phlebitis which eventually subsided.

The redness in this case was only reduced by an excision of the tissue causing the trouble. The result was satisfactory.

19. Secondary Diffusion of the Injected Mass.—This is a condition that no operator can foretell, although it might be caused by a primary diffusion due to hyperinjection of so small an extent that it escaped the surgeon's attention at the time.

Again a site injected, may at the time of operation, present all the indications of a satisfactory result, that is, the tissues at the place of operation and its immediate vicinity appear perfectly

loose and elastic; the injection being made easily and the contour of the defect being remedied either partially or entirely as the operator may desire; there being no mechanical anæmia post-operatio, and no decided effort on the part of the tissues to cause primary elimination after the withdrawal of the needle; yet it is possible that, by such an injection, sufficient pressure may be caused upon some of the blood vessels within the limitations of the injection as to cause a decided reaction a few hours after the operation, as evidenced by a swelling, too great for the disturbance occasioned, and associated with all the signs of a fairly active inflammation.

It is possible that such a reaction may cause a displacement or diffusion, post primary, of the mass injected, especially if the mass be merely vaseline or a mixture of vaseline and paraffine at a melting point too low for the purpose. Nevertheless, it is practically impossible to foresee such result and the operator can only use the same care as with any or all such injections.

It is possible, when the reaction is too marked, to mitigate, to a great extent, this diffusion of the injected mass, by using such methods as reduce the inflammatory symptoms.

As a rule these cases exhibit considerable ecchymosis after this active reaction has subsided, lasting from one to two weeks.

Secondary diffusion, as the author uses the term, signifies an extension of the injected mass beyond the intended area. This may occur in two or three weeks or be proportionate to the activity of the production of fibrous connective tissue that is supplanting the mass.

Leonard Hill¹⁰⁷ has reported a case in which he injected vaseline to correct a saddle nose for esthetic or cosmetic reasons. The result was very satisfactory to both operator and

patient and continued so for nearly twelve months when secondary diffusion of the mass began to be noticeable. Eventually the diffusion became so great in the upper eyelids as to close both eyes completely.

The worst case of such secondary diffusion the author has ever heard of or seen, came to his attention early this year. The patient had been subjected to a subcutaneous injection of oils for the cosmetic correction of an abnormal deepening of the inner clavicular notch. The injected mixture, as far as the author could learn, was made up of sweet almond, peanut and olive oils with two others that had been forgotten. Her physician had made two injections several days apart with a satisfactory result. The reaction was trifling and the parts returned to the normal in two weeks.

Five months later the part injected became tender to the touch and began to enlarge daily. With the increase in size a gradual inflammation involved the whole lower region of the anterior region about the root of the neck. Various applications were made to the part to reduce the inflammation, but at the end of ten days a region of skin, that had indicated the pointing of an abscess, burst, allowing the escape of about eight ounces of pus. Under the most careful surgical attention this discharge continued for about three months, until under the influence of gauze packing the wound was made to heal from the bottom leaving an ugly irregular scar at the site of the opening. With the healing of this fistular wound, however, the size of the tumor did not diminish whatever but continued to grow until, at the present time, one and a half years after the injections had been made, the size of this peculiar hyperplastic growth of ovate form measures nearly five inches across its horizontal diameter and

three and one-half inches through the vertical. It is closely adherent to the overlying thickened skin, which has undergone a yellow pigmentary change to be considered in the next text subdivision. The tumor is hard, painless and freely movable beyond the limitation of its skin attachment and rests upon the sternal thirds of the clavicles, extending upward and forward with evidences of traction on the whole anterior skin of the neck. Laryngoscopy discloses nothing abnormal. The deformity is hideous and necessitates a mode of dress to conceal it. The patient has not as yet been operated on for the extirpation of the growth, owing to her present physical condition, the result of melancholia.

Scanes-Spicer¹⁰⁸ injected some vaseline to correct a saddle nose with satisfactory immediate result, but after several days, the upper lids became slightly œdematous and soon after a small hard lump, the size of a grain of shot, was felt in the left upper lid.

Harmon Smith¹⁰⁹ observed a secondary diffusion in two cases in which the abnormality in one occurred on the side of the nose and in the other at the inner canthus following the course of the angular vein.

While in the foregoing cases the difficulty may have been overcome by using the cold, semisolid paraffine mixture and reducing the amount injected, it is questionable if the diffusion could thus have been entirely overcome.

The author points to the fact that undoubtedly this fault is observed more when the tissues at the side of the nose, or about the alæ, are injected and that the cause here is one of an unequal pressure of the parts—the skin more or less bound down above and the unyielding cartilage below.

In such cases great care should be exercised in the amount injected and if, after introducing the needle, the tissue be found to be unduly adherent and inelastic, to withdraw the needle and with a fine tenotome divide or dissect up the skin before the mass is injected. At no time would an operator be justified to inject more than ten drops of the mass, at a single operation, into the parts referred to.

As already mentioned, there is not only danger of diffusion of the mass in such region of the nose, including the lobule and the sub-septum, but there is a special danger of gangrene from pressure where the tissues are less supportative than where muscular tissue or greater mobility of the skin is found.

After the immediate attempts to reduce a reactive inflammation, nothing can be done to overcome secondary diffusion except excision of the amount not wanted. This should not be undertaken until at least three months after the time of injection.

The mass of connective tissue must be entirely excised as thoroughly as possible, and slightly beyond the border of the abnormal elevation. A sharp curette is practically of no use for this purpose and only wounds the skin, and by reason of retentive shreds of tissue may cause infective inflammation.

The opening into the skin should be made with a fine bistoury, the skin be dissected off from the elevated connective tissue and the latter extirpated by dipping cuts of a fine small, sharp-pointed, half-rounded scissors. The operation can be done neatly and painlessly under Eucaine anesthesia.

The wound may be sutured with fine silk or be allowed to unite of its own accord.

It is advisable to supply a small pressure dressing, made of a

circular gauze pad, over the site to assure of the best union between the dissected or undersurface of the skin and the floor of the wound.

Dry dressings are to be preferred, since moisture would tend to soften the skin and permit it to crawl which would not improve the ultimate result.

20. Hyperplasia of the Connective Tissue Following the Organization of the Injected Matter.—The overproduction of connective tissue replacing the injected mass is rarely observed, yet a few cases have been noted.

Sebileau¹¹⁰ has reported a true case of diffuse fibromatosis following an injection of paraffine. This not only included the site of the injection, but extended to the surrounding or adjacent tissue, making the secondary defect much more disfiguring than the first.

The author has observed one case of such an hyperplasia following the correction of a saddle nose. The area injected presented no unusual appearance for six months when the nose at its middle third began to enlarge slowly until it resembled a marked Roman shape, the enlargement extending laterally and as far down as the nasogenian furrows at the end of nine months.

The injection used was a cold, semisolid paraffine mixture and only sufficient to barely correct the defect was injected, the skin being thoroughly flexible at the time of operation.

No reason can, therefore, be given for this unusual result, except, perhaps, a peculiar idiosyncrasy of the tissues, that may be compared, somewhat, with the external tissue changes in hypertrophic or keloidal scars, especially noted in the wounds of negroes—a condition for which we have, as yet, found no attributable cause.

While we cannot definitely prevent such a result, following an injection of a hydrocarbon, we may at least be sure that hyperinjection is not the cause.

Once the hyperplasia is established the surgeon must simply wait until he believes the activity of the abnormal growth has subsided and then remove the superabundant tissue with the knife.

With another case, in which the patient was operated on by another surgeon, the author was called upon to remove the growth. A part of the coarse, yellowish pale and cartilage like tissue was excised, sufficient to restore the parts to a normal contour. After an uneventful recovery the patient went away, greatly pleased, only to return in six months, presenting a similar condition as before the extirpation.

A second operation was done, this time more extensively, the entire yellowish connective tissue being removed by the aid of a long median incision on the anterior aspect of the nose.

The wound healed readily and showed very little scar and the patient was discharged. One year after the last operation the nose was still normal in appearance and the growth had not reappeared.

From this it is deemed absolutely necessary to remove practically all of the newly formed tissue to warrant a nonrecurrence of the fibromatosis.

21. A Yellow Appearance and Thickening of the Skin after Organization of the Injected Mass has taken Place.—This condition of the skin is evidenced some time after the injected mass has become organized, beginning about the sixth month after the time of injection. It has been especially noticed with the hard paraffine fillings of the nose but also with other injections, even

of the lowest melting points, about the sterno-clavicular regions of the neck.

The skin becomes at first streaked with a superficial and irregularly defined patch of red, the forerunning indication of the size of the ultimate pathological change. The red color subsides slowly leaving the area pale which thereafter gradually thickens taking on the appearance of a light yellow stain in the skin.

Practically opposite to the condition in xanthasma, where the yellow area is slightly elevated and occurs in the loose tissue of the eyelids.

The cause seems to be a degenerative change in the skin dependant on pressure upon its underlying tissues. Evidently the pressure of an overproduction of the connective tissue which has sprung up to replace the injected mass.

Seemingly the cause is due to an injection being made too close to the derma where the latter is bound down to the subcutaneous tissue, or a desire on the part of the surgeon to prevent an injection into the deeper areolar tissue, especially when the injection is made in the vicinity of the larger blood vessels for fear of causing embolisms or phlebitis.

Excluding the use of hard paraffine for such injection, the operator should be sufficiently experienced to use these injections properly and without fear, and at all times avoid injecting into the skin instead of subcutaneously.

Making the puncture first and observing if blood flows freely or trickles from the detached needle will assure the operator into what tissues he has thrust his needle.

Should active bleeding follow the puncture, he should withdraw the needle and wait to inject the site at a later sitting,

using the same precaution ; at no time should he be in doubt as to the absolute placing of the injected mass.

When the injections are done about the lower neck or shoulders great care must be exercised to avoid the blood vessels, and small quantities be only injected to prevent reactions that may cause phlebitis of these vessels ; furthermore the injected mass must be carefully moulded to prevent the formation of uneven elevations or lumps. Without doubt an injection into one of the blood vessels of the neck would mean certain death.

Kofman ¹¹¹ lost a patient by pulmonary embolism 24 hours after an injection of 10 cubic centimeters of paraffine. How many punctures he made to inject this amount is not stated, but certain it must be that he introduced part of the mass directly into some blood vessel.

The author advises, when injecting about the neck, to use a stout, dull pointed needle introduced under local ethyl chloride anesthesia and to elevate the tissue with the needle as the injection is made. In this way the operator can observe the behavior or placing of the injected mass, at the same time stretching the skin to permit of the injection without encroaching upon the blood vessels. The mass is immediately moulded after each injection. The further question of the practical method of making these injections will be fully considered later.

If, however, the pigmentation under consideration has taken place, electrolysis with a fine needle may be resorted to, with the object of whitening the discoloration by producing scar tissue, in the form of punctations, in the discolored area.

While the numerous white spots so caused are objectionable, they are better borne by patients than the pigmented appearance. A thorough needling of the spot in this way eventually

brings about an improvement and if, for esthetic reasons, the patient objects to the unsightliness of the result thus obtained the white area may be carefully tattooed with an appropriate color to match the rest of the skin of the face or neck.

If the pigmented area is not too large, it can be excised with the knife and the healthy skin be brought together with a fine silk suture, thus leaving a thin linear scar which can be dealt with as the punctate scar area, if desired ; the electrolysis being a painful procedure at all times, since sufficient milliamperes must be used to cause scar tissue formation, which is between twenty to thirty milliamperes in such cases.

22. The Breaking Down of Tissue and Resultant Abscess Due to the Pressure of the Injected Mass upon the Adjacent Tissue after the Injection has become Organized.

The above result is particularly noticeable when the injections have been made into the cheek or the breast. It is understood that the suppurative changes under consideration herein are not attributable to imperfect sterilization of the injected matter, although it is possible, and perhaps is the cause in 50% of the suppurative elimination of the injected mass from the cheek, that a nucleus of infection is carried into the tissues and is held in suspense for a time, because of its imbedment in a neutral media that does not readily permit of bacteriological propagation, but eventually this nucleus must come in contact with tissue which it can affect, and only then may its infection be taken up.

The author believes that such secondary affections are accountable to pressure effects upon the blood vessels or glandular structure, as in the case of breast injections, the new connective tissue causing a lack of nourishment in the part or

gland, and a resultant breaking down of the tissue, directly influenced in some instances by external violence.

Tuffier ¹¹² reports the elimination of paraffine injected into the breast several weeks after the injection. If this elimination had been caused by primary infection an acute reaction would have taken place at least within forty-eight hours, ending in abscess shortly after.

A case which came to the author's attention was that of a lady who had been operated upon for the correction of a saddle nose three months before. The result had been satisfactory. The day previous to consulting the author she had injured her nose in an automobile accident. The nose was much swollen, very painful and red over the entire upper and middle third. The use of external cold did not relieve the condition much and on the fourth day the skin broke open at one point allowing pieces of the paraffine to escape. Immediate relief followed, the wound healed with a marked sinking of the middle third of the nose. After three weeks the nose was again injected with no further untoward symptoms, the result being satisfactory for two years past.

In this case undoubtedly the exciting cause was directly due to violence, which may be the forerunner in many of such cases, but there is a number of such eliminations directly due to a breaking down of the tissue from internal pressure alone.

There is no way to overcome this difficulty, except to await the definite formation of the abscess and then to puncture the skin directly over the soft fluctuating area and to drain the cavity.

Once relieved, the condition quickly subsides, leaving a certain amount of loss of contour, which can however be corrected several weeks after by a secondary injection.

When the abscess occurs in the cheek it is not advisable to open interiorly, but to make the puncture through the skin, on account of the danger of infection from the buccal cavity and of the imperfect evacuation thus attained.

A trocar and canula of proper size will be found to be the most suitable, the parts being gently manipulated to evacuate the contents of the abscess.

Aspiration can also be resorted to, but for the breast a small linear incision, made under local anesthesia at the most dependant point, best answers the purpose.

A small gauze strip drain may be employed for a few days to insure of perfect drainage in the latter case, the wound being brought together eventually by a delicate cosmetic operation if desirable.

THE PROPER INSTRUMENTS FOR THE SUBCUTANEOUS INJECTION OF HYDROCARBON PROTHESES

Although Gersuny¹¹³ advocated the use of a Pravaz syringe for injecting the liquified vaseline mixture for prothetic purposes, it was soon found that such an instrument was practically useless, especially when the parts to be injected offered more or less resistance to the introduction of the foreign matter.

Other operators, following the advice of Eckstein,¹¹⁴ who advised the employment of "Hart paraffine" of high melting point liquified by heat, raised the objection that, the metal needle became so easily obstructed by the rapid setting of the paraffine in its distal end that, the great force necessary to eject the contents of the syringe usually resulted in a breakage of the glass barrel in the hands of the operator or as in some types of the syringe a separation of needle and syringe at the point where the former was slipped upon the ground point of the latter, with the annoyance of the paraffine squirting over the faces of both patient and operator.

Eckstein tells us how to overcome the first difficulty with this same style of syringe as used by him. He covers the syringe with a rubber insulating sleeve and draws several drops of hot, sterilized water into the needle to overcome the plugging up of the latter; an illustration of his syringe has been shown on

page 26. Mention has also been made of the various methods used to overcome this difficulty by other operators.

It was presently found that such an instrument was not only impractical but also a detriment to procuring desirable results, the paraffine solution shooting out suddenly, in some instances causing hyperinjection, and at other times emerging so slowly, that it required unusual force on the part of the operator—a painful procedure for delicate hands inasmuch as the fingers only can be applied to operate the instrument.

With the object of overcoming this uncertainty of the amount of the injection and the unnecessary exertion to inject any given quantity, as well as to establish enough *vice a tergo* to keep the needle free from plugging up with cooling paraffine, various operators devised instruments, all having practically similar points of mechanical merit and usefulness. The required necessities being to invent a syringe which would have a known capacity, a piston under control of the operator at all times, and metallic needles of proper lumen, to prevent the solidification of the liquid paraffine, screwed to the syringe to prevent loosening.

With the object of overcoming these difficulties the author devised a syringe which was made for him by Tieman & Co., early in 1902. He begs to introduce the same here, as a type similar to which most operators have built their special instrument.

The syringe at that time consisted of a glass barrel, of a size to hold 6 c. c. of liquified paraffine. At either end of the barrel tube were placed metal ends, the distal one containing a cap with a screw thread to receive the needle, the upper cap being threaded to receive a check nut through its center and on its outer surface, on opposite sides to each other, two metallic

rings to accommodate the thumb and forefinger. The center of the check nut was double threaded to receive the piston rod ; the piston or plunger being held in place by two, upper and lower washer nuts, the lower being threaded to receive a small rod passing through the bored out center of the piston rod, and which ended in a check nut, in the handle, threaded upon the outer or manual end of the piston rod, in such a way that the fibre or asbestos piston washer could be tightened and loosened at will.

The syringe permitted of being used as an ordinary syringe by unscrewing the cap check nut or be made into a screw drop syringe by screwing the same nut into place. By turning the handle end of the piston rod the contents of the syringe were forced out smoothly and evenly in any quantity desired.

With the later employment of the cold, semisolid preparation of vaseline and paraffine, as heretofore considered, it was found necessary to reinforce this syringe so that the greater pressure necessary to eliminate the worm-like thread of hydrocarbon would not force off the lower cap or break the barrel of the syringe at its needle end.

This was done for the author by the Kny-Scheerer Co., Dec. 6, 1902, when metallic strips were added to opposite sides of the glass barrel connecting the lower with the upper cap.

The instrument as then made is shown in Fig. V.

At the same time the same firm made the author a syringe entirely of metal, similar in construction, except that the barrel was made larger in diameter and shorter in proportion to bring the instrument near to the seat of operation. The regulating washer rod was not needed, since in this instrument no washers were required the piston head being made of solid metal through-

out and the rod being soldered to the plunger, thus overcoming any objectionable fault in sterilization.

This type of syringe was found to be most suitable for the

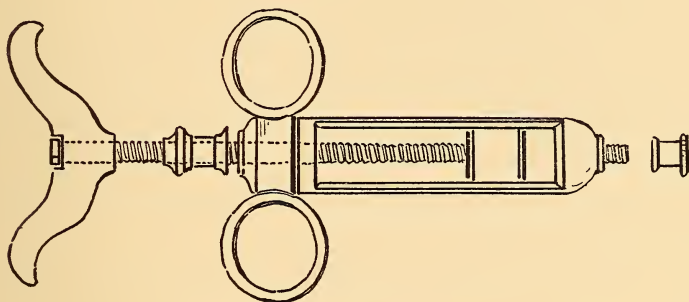


FIG. V. Kolle Screw Drop Syringe.

cold, semisolid injections and is of the type now universally used except for the slight modifications of the various operators. It is illustrated in Fig. VI.

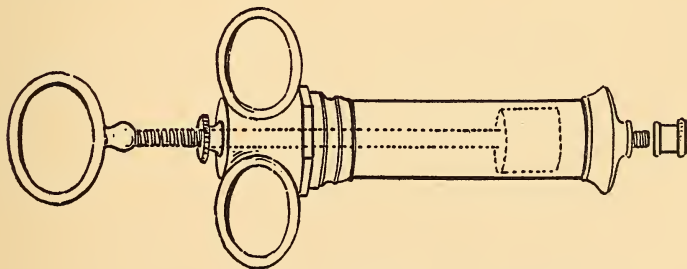


FIG. VI. Kolle All Metal Screw Drop Syringe.

Since there were no objections to making the barrel large enough to permit of injections, such as are required for restoring the contour of the cheek and the neck and shoulder, it was

made to contain 10 cubic centimeters working capacity, overcoming the necessity of constant refilling, when comparatively large injections had to be made—a fact worth remembering from a practical standpoint, although two or three of these syringes specially prepared for each patient, might be found desirable by some operators. Yet the simplicity and ready facility with which this instrument can be used and refilled renders it useful and sufficient for performing operations of this nature to any judicious extent.

Syringes holding small quantities of the paraffine mixture are found to be a nuisance.

The following operators employ syringes of the capacity given :

Brœckært ¹¹⁵	3 c. c.	50 m. m.
Eckstein ¹¹⁶	5 c. c.	80 m. m.
Freeman ¹¹⁷	5.6 c. c.	90 m. m.
Downie ¹¹⁸	10 c. c.	150 m. m.

The instrument employed by Brœckært, holding less than one dram, would be of little use except to correct very slight deformities about the brow or nose, or dressing up or completing the contour of parts previously filled by larger injections.

Another syringe similar in type to the author's, but of a capacity of 5.6. c. c. was introduced by Harmon Smith.¹¹⁹

The principles of the syringe are alike, but the style of handles, two flat metal bars at opposite sides, offers an objection when comparatively hard mixtures of paraffine and vaseline are used.

While operating the syringe the narrow blades are brought

in contact with the soft flexor sides of the thumb and forefinger, indenting the flesh deeply and with the least unexpected move on the part of the patient permitting it to slip out of the grasp of the surgeon. Its incapacity for large injections also offers some objection, but for correcting smaller defects it is both practical and compact. It is illustrated in Fig. VII.

It is obvious that with the screw drop type of syringe the cold semisolid paraffine mixture contained in its barrel is always under the full command of the operator, nor can there be a plugging of the needle since the great force that can be exerted

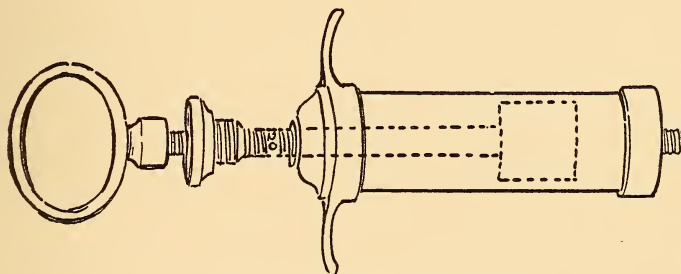


FIG. VII. Smith's Screw Drop Syringe.

with a turn of the piston handle would free it, even if the mixture were of a comparatively high melting point, although the force to be applied would naturally increase in proportion to the hardness of the mass within the syringe.

The turning of the screw piston forces out the contents of the syringe in the form of a white thread of a diameter equal to the diameter of the lumen of the needle.

To facilitate this ejection, the needles should be of ample diameter, not over one inch long and having knife edged points.

Longer needles are not necessary and only add to the force required to turn the screw handle.

Curved needles, used by some operators, are never needed and the author does not see how they could be applied at any time in preference to the straight.

As much of the paraffine mixture can be forced out of the syringe as may be desired by screwing the piston down into the barrel.

The piston rod may be graduated in five or ten drop divisions, but the operator rarely ever refers to the scale. He judges the amount required by the elevation of the tissues brought about by the presence of the paraffine thus forced under the tissue. Experience soon teaches him the amounts necessary or judicious in each case, always remembering that it is better to do a second and later injection than to hyperinject.

The entire instrument being of metal, permits it to be sterilized as readily and in the same manner as any other metallic instrument.

It is understood that the syringe must be taken apart for sterilization at all times.

Lubrication, to facilitate operation, is never required since the nature of the mixture used in the syringe answers this purpose in every way.

Owing to the greater amount of metal in the solid piston itself the latter is very likely to expand under dry heat sterilization or boiling, so much so, that for a moment it cannot be introduced within the barrel. This can be quickly overcome by dipping it into cold sterile water or absolute alcohol which brings about its contraction.

After using, the syringe should be emptied entirely, unscrewed

and sterilized and placed in the metal case furnished for it. A screw cap is furnished to take the place of the needle when not in use.

The method of filling and using the syringe will be considered later.

PREPARATION OF THE SITE OF OPERATION

The same surgical precautions should be observed when a paraffine injection is to be undertaken as with a minor surgical operation.

It is hardly found necessary to prepare the site of operation the day before, nor need the patient be detained for such time for the purpose of making him ready.

With careful observance of ordinary surgical technic, both as to surgeon and patient, all of this class of operations can be performed in any physician's office, providing that both instruments and the mass to be injected have been rendered sterile.

Especial care should be given to the operator's hands, for with these he not only handles the instruments but must also mould the mass injected, thus frequently coming in contact with the needle opening or openings made in the skin.

When injections are to be made in the cheeks of the patient, the mouth should be prepared by cleansing the teeth thoroughly and washing out the buccal cavity with warm boric acid or hydrogen peroxide solution, or any of the preparations of the Listerine composition.

This rinsing should be continued every few minutes for at least ten minutes before the operation is undertaken.

This is necessary as the surgeon must introduce his finger

into the mouth and behind the cheek to mould out the mass injected subcutaneously and infection could easily be introduced by his fingers during this procedure.

Externally a generous field of the operation is scrubbed with a brush dipped into green soap and water.

The skin is then thoroughly washed with gauze sponges steeped in absolute alcohol, followed with spongings with a 1 : 5000 solution of bichloride of mercury. The whole surface is then wiped off with a sponge dipped in ether and covered for the time being with a pad of sterilized gauze until the operator is ready to proceed with the operation.

PREPARATION OF THE INSTRUMENTS FOR OPERATION

The manner of preparing the necessary mixture of paraffine has been described on p. 39. After such preparation, the mixture, still hot, may be poured into test tubes which are sealed and put away for further use, each tube holding just enough to fill the syringe two-thirds full.

When a syringe is to be filled, one of the tubes is opened and the contents are again boiled over a spirit flame, or simply liquified and poured into one of the types of heaters already described for the same purpose of reesterilization.

From the test tubes or the heater, the boiling mixture may be drawn up into the sterilized syringe to the required amount or it may be poured into the opened piston screw cap end.

In the latter event the ready cooling of the mixture as it enters the needle will permit it to be retained in the barrel, or the needle may be immersed in sterile water as the paraffine is poured into the syringe, yet even if a few drops escape from the needle in the former method, no harm is done, as such loss amounts to nothing and helps to eventually fill the syringe evenly and free of air.

If the mixture is drawn up into the barrel to the required height, more or less air enters, which must be removed by turning the syringe, needle up, and screwing up the piston rod until either the liquid or cylindrical thread of the cooled mixture appears.

If the mixture is poured into the syringe the piston is slowly pressed into the barrel, thus allowing the air to escape along its sides if the mixture is set, or if warm the syringe is turned up and the piston screwed into place. As this is done the few drops of cooled paraffine will be forced from the needle before the air is exhausted. The screw is turned until the paraffine emerges evenly from the needle.

The syringe must now be laid aside, or placed in sterile water of the temperature of the room, to allow the liquid within to set evenly and become uniform in consistency.

The operator will follow what method he pleases in filling his syringe, but at no time should he fill it with the cooled product with a spatula, or other such means, as he is sure to fill it unevenly in this way, incorporating a number of air spaces. The air issues from time to time during an operation with sudden sputtering outbursts, that not only tend to annoy the patient but also to frighten him—the shock being unusual and unexpected, while the air thus forced into the subcutaneous tissues puffs out the parts and interferes with a perception of the proper amount to be injected and adds to the danger of air embolisms.

Slipshod methods are inexcusable and should not be tolerated. The best results possible should be given the patient, and only from the best results obtained with the best care can the most reliable data be attained, all helping to fix the reliability, efficacy and exactitude of this branch of cosmetic surgery.

THE PRACTICAL TECHNIC

The field of operation and the instruments having been properly prepared as described the modus operandi must next be considered.

Since the various parts of the face to be injected demand specific procedure they will be considered somewhat individually hereafter, whereas the general technic, applicable in as far as the method of injection is concerned and applying similarly in all cases, may tersely be first taken up.

Various and noted surgeons point out that these subcutaneous injections should be made under general anesthesia, i. e., ether, while others consider the hypodermic use of cocaine or eucaine β solution in 1 to 4% necessary to accomplish good results.

The author considers the method in the first case objectionable both as to patient and operator entailing much discomfort to the one operated on and demanding an unnecessary waste of time for the etherizing and recovery. Likewise is the employment of a local anesthetic not indicated nor demanded, since the operation to be undertaken necessitates only the pain associated with the prick of the needle through the skin.

The objection to etherization is obvious, while the hypodermic employment of any local anesthetic, by the very fact of its presence of volume and its physiological action upon the tissue,

tends to interfere with the proper injection of the parts by reason of temporary swelling of the parts, not caused by the later injections of the prothetic mass.

If in nervous irritable patients an anesthetic is required to allay fear it is best to use the ethyl chloride spray upon the skin sufficiently to overcome the sharp sting of the needle insertion. For this purpose the ether spray is used only to the point of blanching the skin and no longer.

This mode of procedure is especially useful when a number of injections are to be made, as in the rounding out of a cheek or of the shoulders, in which the contour cannot be restored from one point of injection as will hereinafter be described.

The patient being now in readiness, the skin over the area is lifted or pinched up with the fingers of the left hand of the operator as a guide to its mobility and to steady the part.

The point of the needle is now forced through the skin and into the subcutaneous tissue at a point along the periphery of the deformity and pushed a little beyond the center of the cavity to be filled.

The elevation of the skin is in the meantime partly kept up with the needle itself, while the syringe is grasped with the freed hand, the thumb and forefinger of the right hand being placed upon the handle of the screw or piston rod which they must rotate to force the semisolid mass from the instrument.

Before beginning the injection an assistant is instructed to press with his fingers the tissue about the margin of the defect to prevent the filling from becoming misplaced or being forced into undesirable channels especially if the skin over the defect is found to be thick and inelastic.

The screw handle is now rotated evenly and slowly, dis-

charging the mass to be injected which will soon be evidenced by the rise of the skin over the depression to be corrected.

Only sufficient of the mass must be injected to fairly correct, never to overcorrect, the defect.

Experience alone will assure the surgeon when this point has been attained, since he cannot immediately judge the necessary amount injected as it will appear as a round or irregular lump under the skin, until it has been moulded or worked out into shape.

Owing to the pressure exerted upon the contents of the syringe, which will continue to emerge from the needle for a time, the needle is left in place for a few seconds before withdrawal, so that the needle canal through the skin will not become filled with the semisolid mixture.

Such blocking up of the opening causes a cystic development or enlargement about the opening in the skin by this backing up or exuding, oftentimes crowding itself in between the layers of the skin and necessitating later removal with the knife. If not this fault it tends to keep the wound open unnecessarily after the operation preventing healing and permitting the escape of a certain amount of the injected mass, if a mixture of low melting point has been utilized.

The needle, having been allowed to remain as advised, is now withdrawn. The tip of one finger is placed over the opening in the skin and held there gently, but firmly, while the mass is moulded into the shape required or desired with the fingers of the right hand.

If it now appears that the injection is insufficient the needle may again be introduced through the same opening and more is injected, remembering, however, that if the correction is quite normal no more should be added for several days, or until the

injected mass has become organized, which should take place in about three weeks.

If it is found that the skin over the defect is inflexible and bound down it will be found advisable to sever or dissect subcutaneously the adhesions that bind it down with the use of a fine tenotome or a spear-headed paracentesis knife.

This may be done two or three days before the parts are injected to assure the surgeon of an absolute cleanliness of the wound.

Mayo¹²⁰ advocates the injection of a saline solution into subcutaneous wounds thus made as a guide to the extent of dissection and to further loosen the tissues.

When the parts, thus loosened, show little tendency to bleed the author advocates immediate injection, as the waiting for several days permits the throwing out of new connective tissue cells that interfere to a certain extent with the proper injection of the part.

It is with such wounds that secondary elimination is most likely to take place, especially if "Hart paraffine" or paraffine of a high melting point has been employed.

This is undoubtedly due to the healing down and contraction of the margins of the wound which seems to progress more and more, encroaching eventually upon the hard mass and ending in inflammation of the overlying skin and ultimate illimination. With injections of softer consistency this is less frequent and, in fact, may be entirely overcome by limiting the amount of the injection at the first sitting, relying upon a full correction for later operations, when the periphery of the wound has become more or less influenced by the presence of the neutral mass between the wounded surfaces.

The subcutaneous dissection referred to must, of course, be done under local anesthesia, preferably the Schleich mixture or a 1% solution of Eucaine β .

The injection of the paraffine, or hydrocarbon mixture, in semisolid form, having been made and properly moulded into shape, is set or fixed by spraying the part with ether or by the application of sterile ice cloths. When liquid paraffine has been injected it will be noted that the paraffine in setting contracts upon itself considerably leaving less of a correction than anticipated.

The needle opening in the skin is next washed off with a 25% solution of hydrogen peroxide and closed over with a drop of collodion.

The patient may then be discharged for the time being, with the instruction to apply ice cloths to the part for at least twelve hours to reduce, as far as possible, the reactive resultant inflammation.

On the third day the collodion patch may be removed and replaced with isinglass adhesive plaster applied with an antiseptic solution. The latter is allowed to remain on the skin until it falls off.

SPECIFIC CLASSIFICATION FOR THE EMPLOYMENT AND INDICATION OF HYDROCARBON PROTHESES ABOUT THE FACE

Reference has been made heretofore to the general indications for which subcutaneous injections of paraffine or its compounds may be employed. With the object of systematizing such indications and to further bring out the practicability and judicious use of the method under consideration the author submits the following tabulated arrangement, with the hope that it may lead to a more concise and better knowledge of the possibilities within the reach of the plastic or cosmetic surgeon.

The face will be considered in such grand divisions as are easily and readily understood, the defects of each part being shown under its distinctive regional heading.

DEFORMITIES ABOUT THE FOREHEAD

Transverse Depressions	{ Punctate. Linear.
Deficient or Receding Forehead : (Exhibition of Undue Superciliary Ridges).	
Unilateral Deficiency	{ Traumatic. Surgical (Frontal Sinus).

Inter-ciliary Furrow	{ Single. Multiple.
Temporal Muscular Deficiency	{ Unilateral. Bilateral.

DEFORMITIES OF THE NOSE

Anterior Nasal Deficiency	{ Superior third. Middle " Inferior " Superior half. Inferior " Total.
Lateral Insufficiency	{ Unilateral. Bilateral.
Lobular Insufficiency.	
Inter-lobular Deficiency.	
Alar Deficiency	{ Unilateral. Bilateral.
Subseptal Deficiency	{ Partial. Complete.

DEFORMITIES ABOUT THE MOUTH

Labial Deficiency	}	Upper Lip	{	Unilateral.
				Median.
				Bilateral.
	}	Lower Lip	{	Unilateral.
				Median.
				Bilateral.
Naso-labial Furrow			{	Unilateral.
				Bilateral.
Oral Angular Furrow	}		{	Unilateral.
				Bilateral.

DEFORMITIES ABOUT THE CHEEKS

Deficiency of Cheek	}	Total	{	Unilateral.
				Bilateral.
		Partial	{	Unilateral.
				Bilateral.

DEFORMITIES ABOUT THE ORBIT

Deficiency of Lid Contour	}	Upper Lid	{	Unilateral.
				Bilateral.
		Lower Lid	{	Unilateral.
				Bilateral.

Furrow About Canthus	{ Unilateral.
	{ Bilateral.
Deficiency of Ocular Stump	{ Unilateral.
	{ Bilateral.

DEFORMITIES ABOUT THE CHIN

Anterior Mental Deficiency	{ Partial.
	{ Total.
Lateral Mental or Angular Deficiency	{ Unilateral.
	{ Bilateral.

DEFORMITIES ABOUT THE EAR

Pro-auricular Deficiency	{ Unilateral.
	{ Bilateral.
Post-auricular Deficiency	{ Unilateral.
	{ Bilateral.

SPECIFIC CLASSIFICATION FOR THE EMPLOY-
MENT AND INDICATION OF HYDROCARBON
PROTHESES ABOUT THE SHOULDERS, ETC.

Supraclavicular Deficiency	{ Unilateral.
	{ Bilateral.

Infraclavicular Deficiency	{	Unilateral.
		Bilateral.

Interclavicular (Notch) Deficiency

Supra-acromion Deficiency	{	Unilateral.
		Bilateral.

Infra-acromion	{	Unilateral.
		Bilateral.

Supra-mammary Deficiency	{	Unilateral.
		Bilateral.

Mammary Deficiency	{	Partial	{	Unilateral.
				Bilateral.
	{	Total	{	Unilateral.
				Bilateral.

Supra-Spinous Deficiency	{	Unilateral.
		Bilateral.

Infra-Spinous Deficiency	{	Unilateral.
		Bilateral.

Interscapular Deficiency

SPECIFIC TECHNIC FOR THE CORRECTION OF REGIONAL DEFORMITIES ABOUT THE FACE AND SHOULDERS

DEFORMITIES ABOUT THE FACE

TRANSVERSE DEPRESSIONS

Punctate Form.—Such deficiencies are either of sharply defined depressions in a part of the frontal bone due to congenital malformation or of traumatic origin.

In the first instance, they are usually unilateral or median and rarely ever bilateral. In those of the second class the deformity may be median but is more often found to be unilateral.

Linear Depressions of the forehead are usually found to be congenital, although traumatism in the form of direct violence may be the cause, as for instance the kick from a horse or a severe blow or fall.

The acquired linear form of lack of contour is found in people of middle life given to undue use or corrugation of the forehead, as in frowning.

The correction of this class of deformities may be accomplished by carefully raising the depressed area by repeated injections of small quantities, always avoiding the frontal and supraorbital vessels.

At no time should such a deformity be corrected in one sit-

ting, unless when the defect is a congenital one of small moment.

The reaction following these injections, owing to the close attachment of the integument to the bone, is usually found to be more severe than where the skin is more loosely attached.

In traumatic cases the scar attachments should be freely liberated, under eucaïne anesthesia, by the aid of a fine probe-pointed tenotome, before the cold paraffine mixture is introduced.

In such event only one opening should be made and just enough of the mixture be injected to raise the skin to its normal contour, if this be possible. Generally, later injections are required and these may be made without further dissection. They should not be undertaken until the incised wound made with the tenotome has healed thoroughly, otherwise the pressure of the injection is liable to burst through the delicately healed wound and thus delay if not endanger the success of the first operation.

When the reaction following such injections be severe associated with considerable œdema, cold pack or ice cloths should be applied or resort may be had to hot applications of antiphlogistine. The patient should be kept on his feet during the day and sleep with the head high at night. The bowels should be kept open and general tonics be given if indicated. The patient usually returns to the normal, except for a little tenderness about the forehead, in three or four days under the treatment outlined.

DEFICIENT OR RECEDING FOREHEAD

In this condition there is usually a transverse lack of contour across the forehead above the superciliary ridges giving the

patient a degenerate appearance. The defect is congenital and is to be corrected as described in the foregoing division, although the injections may be at either outer or temporal end of the forehead, gradually being brought nearer to the median line until the contour of the whole forehead has been raised by subsequent injections.

UNILATERAL DEFICIENCY

This defect may be traumatic—the result of direct violence, but is more commonly due to a frontal sinus operation.

In both events it will be found necessary to detach the cicatrices that bind the skin down to the injured bone, before a prothetic injection may be undertaken.

In some cases where the cause of the deformity has been moderate and the scar is linear and of long standing the injection may be undertaken without subcutaneous dissection.

Several injections are necessary, as the tissue about such parts is usually much thickened, apart from the firmness added by the scar tissue.

A short stout needle should be employed, the puncture being preferably made under ethyl chloride anesthesia, as the pressure necessary to raise the tissue causes considerable pain.

To further facilitate the injection the operator should raise the skin with the needle introduced subcutaneously.

Only one injection of small amount (10–15 drops) should be done at a sitting. The injected mass, unless too easily introduced and thus forming a tumefaction, need not be moulded out, since the pressure of the skin overlying it will accomplish it more satisfactorily, while the pressure required in moulding

tends only to press out more or less of the mass, thus lessening the benefit of the operation.

A second sitting must be undertaken in not less than one week, or even later, if a subcutaneous dissection has been done.

The secondary treatment should be followed as heretofore described. The reaction, for even a small injection in these cases, is usually considerable.

INTERCILIARY FURROW

This deformity is usually spoken of as a frown. It may be said to be congenital, when it appears in early life but is commonly acquired through the habit of frowning.

The furrow may be a simple linear one or made up of a number of furrows. The author has been called upon to correct one made up of six distinct furrows.

The furrows or creases radiate upward and outward, cone-like from a point beginning at the root of the nose.

In the correction of this common deformity the operator is tempted to overdo the fault by hyperinjection. A single furrow is readily corrected by a few drops of the injection which should be neatly smoothed out. A little of the mass at this part of the face seems to accomplish considerable, in fact the part seems overcorrected for some time after a judicious and carefully done operation, which is undoubtedly due to the active reaction that follows such cosmetic procedure owing to the close proximity of the frontal veins and those of the venous arch at the root of the nose which undergo more or less phlebitis of a mild type; the resultant œdema depending upon the pressure caused by the mass on these vessels. The intimate relation and anasto-

moses of the latter is clearly shown in the carefully prepared dissection represented in the frontispiece.

In injecting, the needle should be introduced at a point directly at the root of the furrow or furrows, that is at the junction of the forehead with the nose.

A needle one inch long should be used, taking care not to puncture any of the veins which are found to be very differently placed in various patients. If blood flows from the needle puncture, no injection should be made at that point but another be chosen which does not give such result, preferably at a later sitting.

The needle should be introduced well upward under the skin so that its point corresponds to the point of greatest depression.

The injection should be made slowly and continued until a tumor, judged to be sufficient to overcome the major deformity when moulded out has been formed.

This knowledge can only be gained by experience and the operator must be cautioned to underinject rather than cause undue prominence of that part of the face.

If, however, his judgment has not been accurate enough, the operator can immediately thereafter squeeze out enough of the filling to give him the desired correction.

If more than a single furrow is to be corrected, he may inject the two center ones, leaving the outer for later operation.

In multiple furrows the injections must be made in cone-like form, to give a normal contour to the forehead. The apex of such cone corresponding to a point at the root of the nose, and the base to an arc with its greatest convexity near the median hair line of the scalp, depending upon the length of the furrows.

The injections in such cases should be made at least three

days apart, two being made at each sitting, after the central or two inner depressions have been raised by the first operations. These later injections should be made to relieve the furrows lying next to the median, gradually working out to each slant side of the cone until the contour of the middle forehead has been made normal.

Never superimpose an injection about the median line until the major defect in general has been overcome, and only then when the first injections have become settled and organized, as such untimely disturbance is liable to set up considerable reaction, with enough induration and resultant new connective tissue formation, to cause a decided lumpy or protuberant appearance of the part.

The mixtures of low melting points should be preferred to the harder variety in frown corrections. They lend themselves to better moulding and seem to undergo organization with less pathological change than those of the latter class.

When the injections must be made over the inner third or half of the eyebrows, as is often the case, they should be made well above the hair line and moulded out in an upward direction, to avoid the dropping down of the mass into the upper lids or to prevent the resultant displacing connective tissue from involving them.

If the upper lids do become involved, as shown by fullness, hardness and partial ptosis, the connective tissue causing the same must be carefully cut out from the lid by a transverse semicircular incision made in the upper lid along the line of its backward fold or hinge. If need be, an elliptical strip of the skin of the lid may be removed at the same time to give better scope to the extirpation under consideration.

The author has recently corrected two such cases where a surgeon had hyperinjected the entire forehead with a combination of oils at one or two sittings. The resultant involvement and later discoloration of the lids at the end of a year's time, might have been expected.

Such wounds, when neatly sutured with No. 1 twisted silk, leave surprisingly little scars, in fact the cicatrices are rarely ever detected a few days after healing has been established.

The treatment post-injectio, for all furrow protheses, should be as already laid down.

Apart from general surgical cleanliness and an antiseptic powder, the blepharoplastic operation mentioned required no special attention. The sutures may be removed in forty-eight hours.

TEMPORAL MUSCULAR DEFICIENCY

Unilateral and Bilateral

This facial defect while possibly unilateral as in hemiatrophy is generally met with in the bilateral form due to either hereditary causes or a lack of nourishment of the parts, the latter usually involving the greater part of the face. Chronic diseases and the cachexia dependent upon disease may be the origin, in which the deformity is rarely ever overcome entirely by internal treatment and massage of the parts; if anything, massage tends to elongate the skin about the temples causing a worse disfigurement in the form of numerous fine furrows.

The correction of the defect under consideration may be readily overcome by repeated and careful injections of a hydrocarbon of low melting point.

The author prefers the use of sterilized vaseline injected in its cold state. The use of paraffine of high melting points or its compounds is not advisable, and if employed leaves the temples uneven or lumpy, due to the unequal organization or new tissue formation caused thereby, at the same time causing sagging of the skin of the adjacent parts, particularly, the upper eyelids owing to the added weight of the new tissue growth occasioned by such preparations.

Contrary to general expectation this part of the face is readily injected and corrected.

The skin should be pinched up with the thumb and forefinger of the left hand and the needle introduced with the right hand in such way as to exclude the puncturing of blood vessels.

To assure the operator against such difficulty the needle may be withdrawn after insertion and if blood does not trickle from the wound it may be reintroduced without pain to the patient and the injection begun.

It is not advisable to correct the defect at one sitting. One-third or one-half of the depressed area may be overcome by one injection. The resultant tumefaction must then be thoroughly moulded out, until little seems to have been accomplished by the injection.

The operator trusts in these particular cases more to the development of new connective tissue than in any other part of the face, except perhaps in the correction of an intercilary furrow. It is surprising how much is attained by the most conservative injections in and about the temples.

The moulding of the injected mass must be done in a superior-posterior direction to avoid forcing it into the upper eyelids resulting in the same over-development previously referred to.

Both temples should be injected as advised at one sitting. The use of the ethyl chloride spray makes the operation less fearful to the patient.

Subsequent injections should not be done earlier than three weeks or until any discoloration of the skin of the parts has disappeared. The latter is not an unusual occurrence and is undoubtedly due to the pressure of the injected mass upon the numerous blood vessels found there.

The post operative treatment should be followed as heretofore advocated.

DEFORMITIES OF THE NOSE

The use of hydrocarbon protheses for the correction of nasal deformities has revolutionized, to a great extent, the rhinoplasty of many centuries. Through their employment many unsatisfactory cutting operations have been entirely displaced and it is quite right to hold, that the introduction of other subcutaneous protheses and like apparatuses of amber, celluloid, catchouc, silver, gold, aluminium, ivory or other nature have been supplanted by this method of operation, when these were needed to correct a partial deformity of the nose.

When a total rhinoplasty has to be undertaken the paraffine group of protheses of course cannot be resorted to, owing to a lack of the necessary representative walls of tissue, except perhaps in such cases where the so-called 'double flap, or French method, is employed and there only after the parts have become thoroughly organized.

A somewhat complete tabulation of nasal defects has been given heretofore which gives an excellent idea of the extensive use these hydrocarbon injections may be put to.

Such nasal deformities as are amenable to this method of correction may be due to either congenital causes, lack of development, direct violence, ulcerative changes following catarrh, syphilis and tubercular disease. In some cases, however, the defects are purely of a cosmetic nature, and not considered as abnormalities except by the critical eye of the patient. This is true particularly with lobular and supra-alar deficiencies, as well as a slight lack of contour about the anterior line.

In some instances, the defect may be an acquired one, as in the lateral deviation known as handkerchief bend.

A specific and somewhat elaborate classification has been given to the more important and distinctive deformities of the nose, principally to facilitate the proper citation and recording of cases.

It may be readily understood that each one of these classifications may be further subdivided, but such subdivision can be only of the degree or extent of the deformity and must be left to the individual operator and his thoroughness of observation and nicety of recording.

The author prefers making a plaster cast of the entire nose which is to be corrected and a second cast after the operation has been completed, or at the time of his discharge. A record sheet, or a direct photograph can be made before and after operation for the same purpose which is not so desirable, however, because it has been found quite impossible to procure the desired accurate pictures of a nasal deformity, the photographer not being given to bringing out imperfections as the surgeon wishes them, even under the most explicit instructions, unless the surgeon accompanies the patient to the studio to supervise the posing. This requires a waste of valuable time ;

not to speak of the expense of making pictures of a pathological nature. The better way would be to have an apparatus in the operating room. The surgeon can then pose his patient against a screen background in the position and to the size of picture he may desire. Plate cameras and time exposures are best for this purpose. For recording and half tone reproduction silver prints are found best.

For all deformities of the anterior nasal line a hydrocarbon compound of the higher melting points should be used. This should be injected in the cold form. The mixture given on page 39, with perhaps an added half dram or dram of paraffine has been found excellent. The addition of paraffine being made to assure a suitable fineness of contour and width. The softer mixtures are more liable to cause a lack of contour and a consequent widening of the part injected, even after moulding, because of the contractility of the skin overlying the injected mass which tends to flatten it out giving the nose a less artistic and delicate appearance.

Furthermore, a soft mixture will be found to be inefficient in overcoming the tension of the skin in most cases, especially those about the middle third of the nose.

In some cases of lateral deformity, and where otherwise mentioned, it is advisable to use only a mixture of the lower melting points as in the case in the correction of interciliary furrows and temporal muscular deficiency.

Superior Third Deficiency.—The degree of depression about the superior third or root of the nose varies considerably. The most extensive form may be commonly found in the negro nose where there is almost an absence of a rise in that part of the nasal bones. Such noses are also found in the Chinese and Jap-



Anterior Superior Third Nasal Deficiency

anese. The condition oftentimes may be associated with epicanthus.

Epicanthus, formerly corrected by an elliptical excision done anteriorly, can be entirely overcome by the subcutaneous injection method, thus not only avoiding the resultant linear cicatrix but building up the depressed nose to its normal contour.

The skin overlying most of the defects of the superior third is usually found to be loose, hence injection is readily accomplished.

The needle should be introduced laterally and anterior to the angular vessels to prevent their occlusion and injection. The point of selection is made at about the middle of the deformity. The needle is introduced until its point lies in the center of the depression, or at the median line from the anterior view.

The mass is injected slowly as the skin of the nose is pinched up between the forefinger and thumb of an assistant.

The part is injected until a tumefaction, equal in body to the extent of the deformity, is attained.

The needle is allowed to remain in place for a moment, to permit of a stoppage of the thread-like mass, usually following the pressure applied to the piston, after the operator has stopped turning the screw. This will prevent the mass from following into the channel made by the needle, or the backing up of the mass, as it were. Should this occur the paraffine mixture should be squeezed from the skin opening to prevent the formation of an inter-cutaneous encystment.

Immediately the needle is withdrawn the operator places a finger tip over the opening and proceeds with the thumb and forefinger of the right hand to mould the mass into the desired shape.

The post-operative treatment should be as previously given and is the same with all injections about the nose, so that it will not be referred to again under this heading.

While a fairly large defect can be corrected at one sitting, it is advisable to rather reinject one or two weeks later to secure the exact shape.

It is to be impressed upon the operator that there is always a slight broadening of this part of the nose following the development of the connective tissue which takes the place of the injected mass, hence the injection should not be overcrowded nor the parts overcorrected.

The mass should be moulded out as narrow as possible and be pinched between the fingers by the patient two or three times a day after the reaction has subsided, which is usually about the third day. This procedure will keep the mass from being flattened during the time tissue replacement takes place.

Middle Third Deficiency.—This defect is commonly seen in football players and pugilists as the result of a breaking of the inferior extremities of the nasal bones and the displacement of the articulating cartilages, although the defect is often seen as a result of an injury to the nose early in life, causing a lack of development in the superior or articulating extremities of the cartilages. Nondevelopment from catarrh, syphilis and intranasal disease are other causes. This type of deformity is generally designated as the saddle nose.

In the latter cases the skin is usually bound down to the cartilaginous structure by cicatricial bands and needs to be liberated. This is accomplished subcutaneously with a fine tenotome introduced laterally.



Anterior Median Third Nasal Deficiency

To assure the operator of a thorough dissection he may inject the site with sterile water through the opening made with the knife, squeezing it out before injecting the nose.

If the skin has had to be freed by surgical means the mass injected should be sufficient to overcome the defect almost entirely, to prevent the reformation of the bands of connective tissue which have been severed. Their re-establishment would mean an unequal development of the new connective tissue springing up from the injected mass thus defeating the object of the operation.

If no dissection has been done the defect should be corrected about two-thirds and added to by a subsequent injection.

The mass in either case should be well moulded out, especially at both sides to keep the nose as narrow as possible. There will be more or less widening ultimately following the organization of the mass.

It is not uncommon to find a dividing wall of subcutaneous tissue about the articulation of the nasal bones and cartilages as evidenced by a rising up or down of the injected mass above or below this line. If this be found, rather than break down this wall with the injection it is deemed advisable to inject each chamber separately and mould the two masses after injection as in the ordinary type of cases.

Inferior Third Deficiency.—This deformity of the nose is due purely to a lack of development or a luxation of the cartilage of the septum and the upper lateral cartilages. The point or lobule of the nose is usually tilted upward and the subseptum curved upward at its middle third.

The cause of this deformity is usually due to direct violence at some time in life, with improper replacement at the time of

injury. Syphilis and intranasal catarrh, lupus and ulcerative diseases are also causes.

The skin overlying the defect may or may not be closely adherent, but is in most cases rather thickened and inelastic. It is therefore necessary, in most cases, to loosen the skin by subcutaneous dissection done as already described before the injection is made.

To rebuild such a nasal defect without dissection, except in such instances where the skin is quite elastic, is not to be advised, since the injected mass would be flattened, more or less, antero-posteriorly, giving the nose a broad and ugly appearance after the connective tissue formation has been attained.

It is with cases of this kind that paraffine injections introduced in the liquid form and of high melting points, are usually expelled in a week or ten days, or even later, subsequent to a breaking down of the surrounding tissues and the resultant abscess.

The best preparation to employ is the form of paraffine mixture advocated in the preceding operation used in its cold state and injected slowly, after the integument has been rendered mobile enough to permit the desirable correction.

The defect should not be corrected in one sitting for the very reason that some widening of the nose may take place owing to the contractility of the skin, post-operatio.

The mass injected should correct the major part of the defect and be moulded out carefully, especially from both sides of the nose and the patient be instructed to pinch the nose laterally several times a day after the reactive inflammation has subsided with the object of keeping the nose as narrow as possible.

After the mass has been thoroughly replaced with connec-



Anterior Inferior Third Nasal Deficiency

tive tissue and the anterior line is found to be too depressed, a fine line of the mass about the thickness of the needle may be injected over it in a vertical direction ; the point of a fairly large needle being introduced just above the anterior aspect of the lobule and thrust upward to the superior border of the now existing deformity and be slowly withdrawn as the mass is injected.

This will leave a rounded cylindrical like mass along the anterior nasal line, which must not be moulded at all, except to soften or shade off the superior and inferior extremities.

The author advocates making two such injections, at the same sitting when the deformity has persisted. These injections are made parallel to each other with a distance of about one-eighth inch between them.

The subseptal deficiency will also have to be corrected. This will be referred to later under its separate division.

The reaction in cases of this type is usually more severe than in those just mentioned. There may be considerable swelling and discoloration, but by following the methods of treatment laid down heretofore the symptoms usually subside in two or three days.

Superior Half Deficiency.—In this type of deformity there is found a nondevelopment of the bridge of the nose, while the greater part of the cartilage of the septum and the lower lateral cartilages seem to be quite normal in contour. The nose has a dished appearance, with an undue prominence of the nasal base or lower half.

Various causes may be given to this condition, but heredity is responsible in a great majority of the cases.

The deformity in the type under consideration rarely takes

in an accurate half of the nose, there being an involvement more or less of the lower anterior half, yet it is sufficiently distinctive to give it specific classification.

For the correction of the defect in such cases the injection is made laterally, the same mass being employed as in the preceding cases.

In this type of case the mass injected should quite correct the defect and be moulded with great care to a desired contour, keeping in mind always the condition and elasticity of the skin overlying it.

An inflexible skin should be rendered mobile by digital massage, practiced for a few days prior to operation, or in tense conditions be loosened by subcutaneous dissection.

The great fault in injecting so large a quantity as is necessary in these cases, is to make the nose too wide from the very beginning, which added to the widening following the replacement by new tissue, makes the shape of the nose unsatisfactory.

For this reason it will be found of some benefit to apply an anterior nasal splint of aluminium, covered interiorly with a fold of white flannel or gauze and pressed into such shape, that when applied to the nose it will keep the latter pinched up laterally to the desired width. This splint will hardly ever be borne by a patient and causes great discomfort until after the post-operative reaction has subsided. It may then be bandaged or held in place by strips of Z. O. Adhesive plaster for an hour or two in the day and during the entire night.

After the first few days' wearing the patient soon becomes accustomed to the splint. It should be worn as mentioned for about three weeks, when the patient may be permitted to pinch

the nose laterally with his fingers two or three times a week or more.

The secondary injection may be made in the ordinary way or as advocated by the author in the manner described in correcting defects of the inferior third of the nose.

Inferior Half Deficiency.—In this type of deformity the greater point of nondevelopment or deficiency is found at the upper extremity of the cartilage of the septum, below its articulation with the inferior border of the nasal bones, and involving to a greater extent the area over the upper lateral cartilages.

This deformity, due to whatever cause, rarely affects the base or inferior part of the nose owing undoubtedly to the greater protection and stability offered by the lower lateral and sesamoid cartilages and the dense cellular tissue making up the alæ. Except in such cases where violence of an extreme nature has been exerted in early life, or where ulcerative disease has broken down most of the cartilage of the septum, the point of the nose is usually normal in size and shape. In the latter cases there is an upper tilt of the lobule and a shortening of the calumna upon itself with a convexity in an upward direction.

The cause of this type of deformity is usually a direct blow upon the point of the nose, syphilitic ulceration internally, catarrh or other ulcerative disease.

When due to violence the point of the nose may or may not present a normal appearance, there may be a normal base tilted upward (*retroussé* or snout nose) or a dropping forward and downward (*hook* or *beak* nose).

The shape of the nasal base depends much upon the time of life the injury was received, that is before or long after pu-

berty, also upon the extent of injury inflicted and where applied.

From injuries received early in life we may look to a lack of development in the cartilage of the septum alone, or associated with deficiency in one or both lateral cartilages.

The deformity is usually symmetrical, but where the nasal bones have been injured as well, particularly where one bone is injured more than its fellow, there is a possibility of the disfigurement being unilateral. This is rarely the case except when due to punctured wounds ; generally in such cases the anterior nasal line assumes a twisted form.

Some operators have included noses of undue lobular prominence (a la *Cyrano de Bergerac*) under this type of deformity and while it is to be admitted such a nose might be built up by subcutaneous prothesis the result is anything but harmonious or normal. Such a nose should be reduced by cutting operations instead of being added to. The seeming depression above the lobule is only comparative to the overdeveloped form of the lobule. The face values of every patient should be studied and the surgeon should never attempt to break up the harmony of facial form by simplifying an operation and rendering the patient's appearance even more ridiculous than before his attempt to correct a fault.

The correction of the deficiencies of the lower half of the nose is associated with difficulties in various directions. Either the skin over the defect is too dense to render injection an easy matter, or the nose is so broadened horizontally from the original injury that the injection, no matter how artistically done, leaves the nose bulky and ugly in appearance.

When the nasal processes of the superior maxillary bones

have not been widened unduly by an injury and the skin is dense, simple subcutaneous dissection before injection will overcome the difficulty easily enough.

In that case the needle is inserted laterally in a line with the maximum depth of the depression and the point shoved up to the median line anteriorly.

Enough of the cold mixture of paraffine and vaseline, as heretofore advised, is injected to reduce the deformity nearly to the normal.

The mass is moulded to give the nose as near a normal contour as possible always keeping in mind the later broadening of the nose when the new connective tissue has taken the place of the injected mass. A later injection made as advised heretofore will restore the anterior line to better form.

If the nasal processes of the superior maxillary bones have been thrown outward considerably a surgical operation is necessary to reduce them.

No injection should be made until the wounds from such operation are thoroughly healed and contracted.

In all cases of this type the skin will be found to be rather dense and likely to be tied down by past inflammations to the anterior aspects of the lower lateral cartilages at their juncture with the upper lateral cartilages. If the adhesions are not too dense the harder form of the cold mixture should be used. This will not only permit of raising the skin more readily than with a softer kind of mixture, but will be more likely to retain its form under the contractile pressure brought to bear down upon it.

When the skin is closely adherent it should be loosened subcutaneously as already advised. The injection may be done at

the same sitting and be of greater quantity than in the cases where this had not been done, for the reasons mentioned.

Pressure splints and manual compression should be employed as in the preceding deformity.

The reaction following the first injection is likely to be severe. Cold applications as previously referred to are indicated and should be continued for at least two days.

Care should be taken not to inject into the lateral vessels which usually lie on a line with the juncture between the lateral and lower lateral cartilages. If this should happen, the point of the nose at once assumes a bluish hue, there is more or less pain felt at once, with considerable swelling a few hours after the injection. Later, every symptom of gangrene of the lobule is liable to be noticed, yet with faithful attention to furthering the circulation of the parts by either cold or hot applications, the active inflammatory symptoms usually subside in ten to fourteen days, leaving the patient with a whole nose, more or less colored at the lobule according to the state of the circulation and the exposure of the parts to the various temperatures. This may be overcome in time, yet it may persist for years, depending entirely upon the ability of the anastomosing vessels to overcome the artificial thrombus or occlusion offered by the mass injected.

That a reaction quite similar in character, but of milder degree, is likely to be seen when one of these vessels have not been injected, can be readily understood when we consider that a hard and somewhat unyielding mass is made to overlie the vessels themselves. The symptoms just described in such case are apt to be noted much later, even several hours after the injection, because the swelling has then begun to add its pressure to



Anterior, Superior and Inferior Third Nasal Deficiency

that of the mass in obstructing the flow of blood to the lobule. Such condition may be termed pressure occlusion in contradistinction to thrombotic obstruction.

These symptoms usually subside in a day or two, or with the swelling caused by the reaction.

If the symptoms appear at once after the injection, it is best to force out as much of the injected mass as is possible through the needle hole through which it has been introduced.

The author was called to attend a case several hours after the operator had injected a nose. The acute symptoms pointed to a direct occlusion of the vessels, yet the surgeon who had performed the operation assured me he had not injected until he found that blood did not flow from the needle after its insertion. To relieve the patient of immediate fright and some pain, a dull pointed needle of larger calibre than the one used in operation, was pushed through the needle wound previously made, taking the place of a canula, and a greater part of the injected mass was squeezed out. Ice cloth applications were followed through the night and the nose recovered in three days without showing the discoloration of the skin usually observed following such cases. The nose was never injected again, on account of the dread of the patient, but peculiarly the anterior line showed almost a normal contour after four weeks had elapsed. This only goes to prove that very much less of the mass to be injected is required than is commonly supposed by operators.

Total Anterior Deficiency.— In this condition there is a scooped-out or general curved-in appearance of the entire anterior nasal line. The lobule of the nose is usually normal in size.

This defect should be corrected by two injections of the paraffine compound previously referred to. The points of injection should be lateral and anterior to the angular vessel on the side of the nose preferred by the operator. One about the center or major curvature and the other about the inferior third.

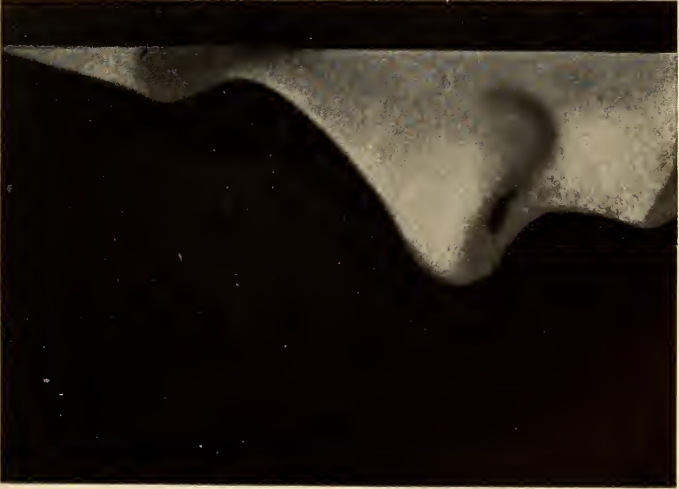
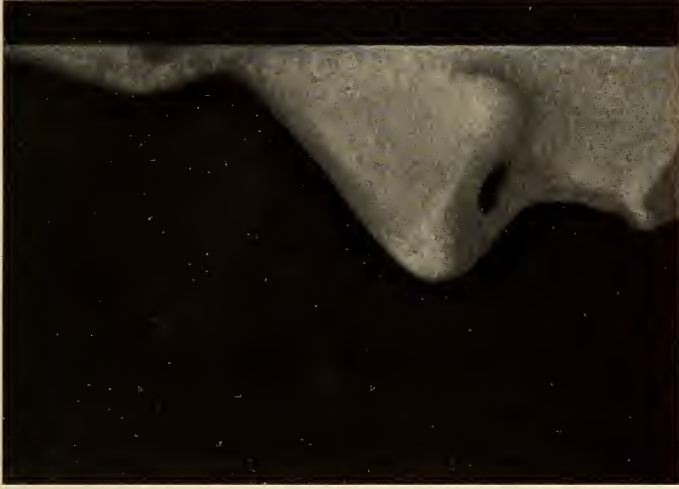
Care should be taken to mould the injected mass as narrow as possible, or as much as the skin will permit. If the latter is bound down it should be mobilized by subcutaneous dissection or levation. A subsequent injection should not be undertaken until the entire mass has become settled or fairly organized, which is about the end of three weeks.

The mass should be injected well up to the root of the nose to give it the appearance of the normal bridge. If this is found impossible owing to a dividing skin attachment, a third needle puncture should be made at a point on a level with the internal canthus.

Care must be exercised to keep the mass from creeping into the loose tissue about the internal canthi by having an assistant press the sides of the nose at that point with the thumb and forefinger.

This undesirable condition is much more liable to occur when a hot liquid paraffine is employed, since the operator can observe quite accurately the extent and direction taken by the mass injected when the cold product is used.

Some authorities have injected noses of this type from the point of the nose, but it will be found that the position of the puncture at this point allows a considerable portion of the mass to work out during moulding and also to permit of the readier oozing out of the mass during the pressure exerted by what reactive inflammation follows the operation. This is accounted



Anterior Total Nasal Deficiency

for by the fact that the needle creates a tube like canal in the tightly bound down tissue overlying the lower lateral cartilages, whereas in the lateral punctures the short canal is easily displaced by the swelling, thus causing its obliteration and preventing the free oozing.

On the other hand, it will be found to be more difficult to inject from the point of the nose alone and that a very long needle has to be used which must be withdrawn as the parts above the point are filled. Furthermore, it will be found necessary to thrust the point of the needle in different directions to overcome vertical attachments of the skin which are more readily lifted up than thrust aside by the mass, hence necessitating a greater amount of injury to the tissues, not to speak of the possibility of injecting transverse blood vessels higher up in the nose of which the operator would not be aware at the time; showing only in the resultant phlebitis and unexpected reactive symptoms, associated with a discoloration more or less lasting according to the extent of obliteration of the vessels.

The post-operative treatment should be as heretofore advised.

Lateral Insufficiency—Unilateral and Bilateral.—Depressions about the sides of the nose are usually due to hereditary causes, when they are likely to be bilateral, yet intranasal ulcerations may cause a falling-in, as it were, of either one or both nasal walls, involving in such instances the entire side or part of it. In the partial cases the depression may be in any of the division of thirds used by the author, that is, it may lie laterally over the region of the nasal bone and such of the nasal process of the superior maxillary bone as goes to make up that part of the nose, or in the middle third below the bone structure and above

the superior limitation of the lower lateral cartilages, or within the lower third over the inferior border of the cellular tissue making up the nasal rim.

Traumatism may be found to be the cause of such depressions, especially in the middle third, after fracture or luxation of the nose. In such cases the defect is usually unilateral or at the seat of the former injury, a convexity usually being exhibited on the opposite side.

Since the skin is rather firmly adherent at the sides of the nose, except in the major part of the superior third, it will be found best to raise the skin of such defect into normal contour by a series of very small injections instead of following the method heretofore advised in connection with tense or adherent areas of skin, for the reason that such dissection would render the skin too mobile over an area usually beyond the defect itself and inviting the surgeon to an annoying hyperinjection which renders the part more unsightly than prior to the operation. This is true in most cases unless the depression is of traumatic origin and beyond the size of deformity usually corrected.

The author advocates the employment of a hypodermic needle attached to the syringe in place of the regular needle and that the injection be of sterile white vaseline without additions of any kind.

Such injections may be made very readily, one or more at the first sitting, being introduced below the deepest part of the defect. It is surprising how much four or five drops of such an injection will accomplish. Furthermore, it is to be remembered that the injections about the side of the nose are readily replaced by new connective tissue, equal to, if not commonly greater in amount than the mass injected, such growth being completed

in about two months after the time of injection. This may be explained by a more or less active perichondritis when the injection is made over the cartilage, the inflammation, thus set up, being of longer duration than where skin and bone or areolar tissue are involved. Any subsequent injection should not be undertaken until at the end of two weeks or more for the reasons above stated.

The injected mass at all times should be introduced under normal pressure, never to the extent of rendering the skin above it white in color. The mass should also be moulded out with the tip of the finger or the rounded, dull handle end of a scalpel. If necessary, the small finger may be introduced into the nostril to facilitate this moulding. Should the reactive inflammation be severe such remedial agents as have been referred to should be used to reduce it.

Phlebitis following injections at the side of the nose is due entirely to the injection of a blood vessel and must be avoided. When a fine needle is used there is less likelihood of free bleeding from an injured vessel, therefore a thorough knowledge of the usual position of the vessels about the sides of the nose is absolutely essential. Bleeding of greater extent than that which would follow the thrust of the needle through the skin should put the surgeon on his guard. Experience is the better teacher and conservatism in these, oftentimes delicate, subcutaneous operations will save the surgeon much annoyance and eventually the need of having the patient submit to a cutting operation to reduce an overcorrected area.

Should a hyperplasia of connective tissue result from such an operation, a small linear incision, under 4% eucaïne anesthesia, should be made directly over the greatest prominence, through

which the offending mass can be removed by the aid of a small hooked knife or a fine pair of curved scissors.

The mass should be removed beyond the plane of the skin, in fact it should be rather removed in cone-like form, apex inward, and the peripheral attachment completely obliterated, in order to obtain the desired result, as it is not unusual to have the prominence reappear after imperfect extirpation and improper dissection.

Moist pressure dressings may be applied over the small wound thus made, for several days, or until the inflammation following the operation has subsided. Suturing such a wound is hardly necessary, but if the incision be over one-fourth of an inch long, two fine silk sutures, deeply placed, may be utilized, their tension adding to the compression needed to bring the mobilized skin into position in reference to the base of the wound.

The author has used contractile collodion in place of compress dressings with very good result. This should be renewed within forty-eight hours.

After eight or ten days silk isinglass adhesive plaster is applied over the wound until it falls off.

Lobular Insufficiency.—This defect of the nose is usually of hereditary origin although it may be occasioned by the retraction of the inferior half of the organ in tubercular or syphilitic ulceration in which the lobule falls inward and upward by the loss of the retaining cartilages.

Owing to the close adhesion of the skin to the lower lateral cartilages and the cellular tissue about the rim of the alæ it is found difficult to restore the contour or elongate the organ at that site by subcutaneous injection.

Even after thorough mobilization of the integument the sub-

sequent injected mass is liable to be thrown off by an overactive inflammatory reaction, due undoubtedly to the adhesions formed between the divided surfaces from the periphery inward which has a tendency to crowd the injected mass forward and downward before a new connective tissue has had time to be formed, causing a breaking down of the skin at some point overlying the mass and allowing it to escape.

The author has attempted to replace the injection by small solid paraffine plates introduced through a small lateral incision made for the subcutaneous dissection, and while the wound healed readily enough and the nose appeared normal the plates were in every case thrown off by a later inflammatory process before the end of the third week.

The author then attempted to replace the solid plates with granular paraffine, gently packing the latter into the wound until the desired elevation had been obtained with the idea that such mass would accommodate itself much better under the pressure caused by reactive inflammation, but even this procedure proved unsuccessful.

The best results are obtained with sterilized white vaseline injections when there is considerable mobility of the skin. A single needle opening should be made, preferably about the center of the side of the lobule, or slightly anterior to this point, carrying the point of the needle forward to the anterior medium line and a little above the actual point of the nose.

The injection should be made slowly, closely watching the size of the elevation caused by the mass and the state of the circulation about the entire lobule.

Usually ten drops of the mass suffice to give the desired result. The mass may be moulded out if found desirable, but if

the skin appears normal after the operation and the tumefaction thus made does not make the nose look grotesque it may be allowed to remain as injected, depending upon the subsequent reactive pressure to force it into shape. In this way a greater part of the mass is retained at the wanted site and is not crowded to the sides of the lobule by the customary post-operative moulding.

Even with this method great care must be exercised in not injecting too much at each sitting. A failure is sure to result in hyperinjection about the lobule. When it be remembered that only a very small quantity of the mass will make a decided difference the surgeon and patient should be satisfied with the slightest gain.

If, however, the mass be retained and further elongation of the lobule is desired a subsequent injection can be undertaken, but not until a full month after the primary operation.

Here, as with lateral nasal injections, there seems to be an overproduction of new connective tissue following such an injection; a decided factor in eventually pleasing the patient.

It is needless to say that the operator must avoid injecting one of the blood vessels of the lobule as this will cause considerable inflammation from which the lobule does not recover readily, owing to the dense tissue the surgeon has to deal with, leaving the tip of the nose discolored and bluish for some time after the operation.

If the injected mass causes an immediate venous stasis of the lobule hot applications should be applied at once, or as soon as the operator discovers that the proper massage and pressure to remove the offending mass does not improve the circulation.

The author advocates the judicious use of antiphlogistine

faithfully applied hot every six hours and continued until the acute inflammatory symptoms subside, when the surgeon may resort to ice cloths or cold pack until the danger of pressure and resultant gangrene have subsided.

Despite the very grave symptoms associated with such inflammation the operator may assure the patient against permanent disfigurement, although the three or four weeks' duration of treatment, usually required in such cases, is an ordeal the cosmetic surgeon and the patient is not liable to forget.

If the injected mass causing this state of affairs has been of liquid paraffine, the better method to pursue is to make several small incisions into the site of the injections and remove the little masses of solid paraffine as far as possible with the view of relieving the pressure or encroachment, at the same time alleviating the pain and stasis by the resultant depletion. Moist, hot applications should follow this procedure. The small wounds made in the skin will heal without suture leaving hardly any perceptible scar.

The author, however, advises against any mixture or liquid paraffine injections about the lobule, never having seen a satisfactory result when either had been employed.

The post-operative treatment in uncomplicated cases may be of aristol and adhesive isinglass plaster or collodion.

Interlobular Deficiency.—This condition is hereditary in the great majority of cases. The defect, while quite disfiguring giving the appearance of a cleft nasal point, is easily corrected by the subcutaneous injection method.

Paraffines of high melting points should, however, never be employed for this purpose for diverse reasons:—first, the hardening of the mass after cooling causes too much pressure upon

the small blood vessels at the point of the nose and results in more or less permanent discoloration of the tip ; second, by reason of the pressure of a hard mass, at the end of the nose, considerable inflammation results which usually terminates in the evacuation of the entire mass and consequent cicatrization ; third, by virtue of the greater irritating qualities of paraffine a greater amount of new connective tissue than necessary is thrown out causing a general and hyperplastic rounding of the entire tip of the nose that requires surgical interference to overcome. In the illustration shown the patient's nose was injected along the entire anterior line and the lobule with paraffine liquified under heat. A marked post-operative inflammation resulted with permanent redness of the entire organ and several decisive capillaries showing about the sides and tip of the nose. This was followed in about six weeks by a progressive hyperplasia which left the nose about three times its natural size, and the lobule a hard ball-like knob of high red color. Several cosmetic operations were required to make the nose appear anywhere near normal, while the electrolytic needling process was resorted to for a number of sittings to destroy the acute redness and the individual vessels showing.

While a great many workers with paraffine deny any beneficial results from the employment of sterile white vaseline for subcutaneous injections the author claims that in this particular class of deformity it is almost exclusively required.

The vaseline in cold state should be injected directly under the skin overlying the deepest point of the cleft and be slowly continued until the lobule assumes its normal contour. The puncture may be made below the point of the nose.

One such injection usually suffices to correct the fault. The



UNTOWARD EFFECT OF PARAFFINE INJECTION
ABOUT LOBULE AND ANTERIOR NASAL LINE
Scar lines on Nose Indicate the Various Attempts
Made to Reduce the Resultant Hyperplasia

reactive symptoms are not severe if proper technic has been applied and cold compresses usually relieve it within twenty-four hours.

Should the skin be adherent about the anterior aspect of the lower lateral cartilages it can be forced away with a small, dull, round pointed knife resembling an eye spud, the opening for which need not necessarily be greater than that made for the needle. The latter is inserted through the same opening which must be closed over in this event with a drop of contractile colodion into which aristol is introduced with the pulverflator, which not only embodies an antiseptic, but at the same time hastens its hardening.

Alar Deficiency—Unilateral and Bilateral.—The contraction about the nasal rims may be due to hereditary causes or the result of intra-nasal disease. The defect is usually bilateral involving the entire alæ or only their lower half or third.

The fault should be corrected by several injections made along the rim of the nasal wing using a fine needle, preferably of the hypodermic size. Vaseline only should be used and two or three drops, according to the extent of the deformity, be injected into the cellular tissue at the point of each needle insertion.

Three of such punctures may be made along the rim, one beyond the other in each wing. According to the defect the injection may be carried higher or lower above the margin of the rim by shoving the needle upward and toward the inferior border of the lower lateral cartilage.

The reaction in these cases is very little, rarely necessitating other than an antiseptic powder-plaster dressing. Subsequent injections should be made if the first do not give the desired contour ; but never until the surgeon is satisfied that the result-

ant new connective tissue thrown out has reached its ultimate growth.

The harder paraffines, especially those injected in the liquified state, are not to be tolerated for the reasons given with the proceeding method of correction.

Subseptal Deficiency—Partial and Complete.—It is not uncommon to find a marked concavity of the subseptum in noses that have sunken in by reason of intranasal disease or traumatism.

This concavity when partial is usually most marked near the lobule but in the complete variety the upward curve may be greatest near its juncture with the lip.

Owing to the usual adhesions formed during the inflammatory period causing the deformity the correction of this defect is quite difficult. As a rule the skin of the entire subseptum needs to be dissected away from the underlying structure before it will permit of correction by the injection method.

This dissection is advocated and can be readily done from one of the nostrils at a point just beyond the union of skin and mucous membrane.

The dissection under such method can be made more thoroughly than when done exteriorly for the reason that the entire field is laid open to a free use of the scalpel leaving no visible cicatrix externally. The dissection may be followed by the immediate injection of the mixture of paraffine and vaseline as already referred to, used cold, or the area is injected with normal salt solution until the intranasal wound has healed, which usually takes place in about five days. The mucous membrane in such instance may be neatly but not too tightly sutured with No 1 silk. If the operator deems it advisable he may inject the salt solution again on the third day to pre-

vent the formation of such adhesions as may interfere with the ultimate hydrocarbon injection. This is rarely found necessary.

If the post-operative inflammation prove mild, then the adhesions will not be as tenacious, in which case the surgeon may wait until even the seventh or eighth day before injecting the paraffine compound to be sure of not forcing the intranasal wound apart under the pressure of the mass injected.

Never should so large a quantity of the mass be injected as to cause blanching of the narrow strip of skin. This is sure to result in gangrene of some, if not all, of the skin of the subseptum—a result much to be regretted since subsequent correction of the deformity increased by the contraction of the dermal cicatrix is rendered well-nigh impossible by reason of this very tissue.

Hard paraffine injected in its molten state is never borne in this part of the human economy. It is usually thrown off after a few days of very painful and highly inflammatory symptoms, undoubtedly explained by the fact that the circulation of the subseptum is principally dependent upon the delicate branches of the two small septal arteries of the superior coronary and a hard unyielding mass would readily cause their obliteration.

DEFORMITIES ABOUT THE MOUTH

LABIAL DEFICIENCY

Upper and Lower Lip

There are a number of causes creating deficiencies about the labial orifice. The same causes apply naturally to both lips whether the defect be unilateral, bilateral or median. Some of

these deformities are more often met with than others, as, for instance, a median deficiency of the upper lip following cicatricial contraction due to a harelip operation done early in life ; in elderly patients a partial paralysis is found to affect one-half the upper and sometimes a part of the lower lip, giving to the mouth a drooped and grinning appearance.

Other causes are dental defects, abnormalities of the alveolar processes, traumatism and disease.

In those conditions where loss of tissue is responsible for the defect, as in the extirpation of neoplasms, ulcerative disease etc., it is quite likely that cheiloplasty is required to rebuild the parts, but in many of these cases splendid results may be obtained by the judicious use of hydrocarbon protheses to overcome the usual post-operative oral distortion. It is understood that such injections should not be undertaken until the wounds are thoroughly healed and the cicatricial union fully contracted. This is true also in harelip operations undertaken later in life.

The correction of labial defects coming under this method is not at all difficult, but artistic skill and judgment are as necessary as the surgical technic.

The lips are plentifully supplied with blood-vessels and therefore greater care in injecting a foreign mass into their structure is necessary, furthermore the lips cannot be placed at rest for any long period of time, so that the mass injected can never be expected to be kept in place if of a consistency hard enough to permit the contraction of the orbicularis muscle to move it about.

From the very fact of this practically constant movement of a part it is self-evident such hard mass could not be retained or held in position for any length of time, unless the mass is small

enough not to be affected by the movement and under such condition the correction of a defect as desired by the patient would require perhaps months to accomplish, owing to the very fact that only drop-like masses may be deposited under the skin in perhaps a half dozen places with the necessity of a long period of rest until the injections have been replaced by the new tissue before the next operation could be undertaken.

It is absolutely absurd to think of injecting a lip with hard paraffine liquified by heat and expect to obtain a satisfactory result. While it is true the mass is mouldable immediately after its introduction, so that a desired shape may be obtained, it does not overcome the fact, however, that the mass must harden, as it will, and that, while a part of it is broken away, as it were, from the mass proper, there is a nuclear contraction as the hardening takes place, thus overcoming partly the moulded form, furthermore, the movement of the parts here tends to displace the mass. Unequal muscular contraction breaks up not only the form but also the mass itself, during all of which time it is made to act as an irritant by virtue of the movement of the uneven edges of the paraffine upon the adjacent tissue.

Furthermore, the presence of paraffine and the resultant mass of new and hard connective tissue, so well recognized by all experienced surgeons, is not desirable in the lip structure; it makes the lip appear bulky and hard and anything but natural.

It is in these very cases that the injections of cold sterile white vaseline is indicated. After injection the mass may be evenly and satisfactorily moulded out, the mass being soft and readily pressed into shape in the various cells of areolar tissue without leaving hard and uneven lumps.

The movement of the lip is not then a source of danger in.

displacing the mass, since the acute swelling of the lip tissue prevents its free movement for several days, which gives the injected mass an opportunity to establish itself and find its proper place.

Another advantage in using this preparation subcutaneously is that it is less irritating than hard paraffine, permits freer movement and creates a better production of new connective tissue.

While a part of the mass may be absorbed during the replacement period the lip retains its normal consistency, and if the desired contour has not been attained a subsequent injection may be made in three weeks' time without interfering in any way with the former result.

The only precaution, aside from avoiding the injection of blood vessels, is to keep the injection from the prolabium or vermilion border. The latter tissue is very prone to fatty degeneration or to yellowish discoloration when such a foreign mass has been introduced into or near its structure.

There is no objection in injecting the lip, upper or lower, in several places as the cellular network about the mouth is sufficiently dense to prevent the escape of the vaseline injected from the adjacent opening if the distance is not less than a half inch between the punctures.

The injections may be made from above downward in the upper lip and vice versa in the lower. They should be begun at the outer angle working toward the median line.

The reaction following such an injection is usually more severe than in any other tissue of the face owing to the great number of fine blood vessels, but the swelling is readily controlled in two or three days by cold applications.

Aristol collodion dressings over each wound suffice to close the punctures.

In the median variety of defect, where a cicatricial band separates the lip into halves, it may be found necessary to do a subcutaneous dissection before a suitable injection can be done, but in cases of long standing the dividing wall is exceedingly thin and the thread-like adhesions below are quite easily broken up by the force of the injection. The later product of new connective tissue will tend to further improve the contour.

Naso-labial Furrow—Unilateral and Bilateral.—This condition in the bilateral form is exceedingly common in adults beyond middle age. It is also found in those individuals suffering from inanition, due to whatever cause. The unilateral form is found principally in patients suffering from semifacial paralysis in which the tissue lacking the proper neurotic supply droops or sags down causing a deep furrow to appear from the attachment of the alæ to the angle of the mouth, associated more or less by a flattening of the cheek contour of that side of the face.

The method of correction advocated by the author varies entirely from the technic advanced by other surgeons.

The usual method has been to introduce the needle of the syringe at the outer or lower extremity of the furrow and from one of such punctures to inject the whole line of depression.

While this seems right theoretically the method does not give the desired result. Owing to the free movement of the upper lip the mass, at first neatly restoring the contour, is crowded upward into the inferior malar region and very often

downward toward the angle of the mouth where it settles in a hard lump which is not only obnoxious to the sight but interferes with the proper use of the parts concerned in mastication and vocalization. Invariably the operator is called upon to remove the disfigurement.

It can be readily understood that hard paraffine itself, in such case, would prove more objectionable than a softer mass which upon early discovery could be moulded or massaged into better position while nothing less than excision would prove efficacious with paraffine.

As with the lip then the author advocates the use of either the cold mixture of paraffine, as heretofore described, or the cold white vaseline according to the operator's opinion in overcoming the extent of the fault. For all ordinary cases white vaseline alone is necessary.

The technic of injection as used by the author is as follows:—In the ordinary case when the furrow is not too pronounced one sitting only is required. Two needle punctures are made above the upper line of the defect, the first being made about one-half inch from the wing of the nose and the other about one inch outward and downward.

The needle is pushed downward under the skin until its opening corresponds to the median line or deepest part of the furrow. Enough cold white vaseline is injected to bring the depressed area slightly above the plane of the skin of the upper lip. The second puncture is made perpendicular to the first and the injection made in the same manner.

With the tip of the indicis over the first needle opening the mass is moulded out evenly by a gentle rocking or rubbing movement. The same is done with the second mass.

It will be found then, that the two masses are made to meet at about the center of the furrow, leaving a slight wall of tissue between them. This wall has the virtue of preventing the falling down of the upper mass, at the same time dividing the quantity of the injected mass into two, and lessening the weight.

If the condition is bilateral both sides are operated on at the same sitting. If subsequent injections are needed they are done three weeks later, the punctures being made between the former first and second punctures and the second and outer border of the furrow. In this way the entire site is filled with a series of injections.

If the surgeon desires he may increase the number of these needle punctures at the first sitting making them nearer together in that event.

It will be found necessary in some cases to inject the cold mixture of vaseline and paraffine into the furrow directly below the wing of the nose, since the integument at that point requires a mass somewhat harder than vaseline to force and hold it up.

The rest of the furrow must, however, be injected with vaseline alone, for the reasons already given in parts that are moveable.

The reaction is rarely very marked and subsides in about three days.

Gentle massage may be permitted above the site of injection to keep the mass from crawling into the cheek. This is done by gently stroking the skin from below upward toward the nose on a line an inch above the original depression.

The dressings are the same as before mentioned, although

collodion painted over the needle openings is most serviceable after having sponged off the sites with absorbent cotton dipped into absolute alcohol to remove the vaseline that may have exuded from the openings during the moulding out process.

Oral-Angular Furrow.—These furrows occur at the corners of the mouth, running downward upon the anterior chin. Small as these defects appear they are found difficult of obliteration, for the reason that the tissues are more or less under constant movement during the waking hours. Repeated injections, each of small quantity, are necessary. Hard paraffine is contraindicated.

The injections are made from above the defect downward at right angles to the defect.

It will be found difficult to keep the mass from being expelled on account of the movement, there being more or less oozing from the puncture, but if the openings can be controlled for at least twenty-four hours this danger may be overcome to a great extent.

Ethyl chloride may be sprayed over the part immediately the needle is withdrawn to set the mass and followed with a drop of collodion. The patient is advised to keep the mouth as immovable as possible for the rest of the day.

The reaction is never severe, and is easily controlled by cold applications. If, after one week, there is shown a tendency to sagging of the mass, it should be gently massaged upward with the finger several times during the day for at least two weeks; this will keep it in place, and allow nature to replace it with new connective tissue when desired.

DEFORMITIES ABOUT THE CHEEKS

DEFICIENCY OF CHEEK

Total and Partial

A total lack of proper contour of the cheek, generally termed flattening, may be due to hereditary causes, but is generally dependent upon a cachexia due to a general disease, or fatty degeneration of the muscular structure of the cheeks, as found in those beyond middle age.

A partial deficiency of the cheek or cheeks is usually hereditary but may be dependent upon digestive disorders or other causes of malnutrition.

This class of deformity is found more often in women than men. It is usually bilateral.

Unilateral cheek deficiency, whether partial or total may be congenital but is often the result of a local paralysis causing hemiatrophy. Traumatism early in life or during birth and amputation of the inferior maxillary are other causes.

This class of deformity is quite readily corrected by subcutaneous injection, in fact it is the only known method of merit, superseding the former resort to partial correction by massage or artificial and temporary correction by the wearing of plumpers in the buccal cavity.

The method of procedure is the same in all cases, the number of injections and quantity varying, of course, with the extent of the defect.

As with the rebuilding of the contour of the lips so with the cheeks, which must of necessity be mobile and flexible, the injection of hard paraffine is out of the question. The author

has observed a number of such cases and is free to say that in each case the result was not only abnormal in appearance, but a source of great annoyance to the patient.

What is worse, is that the paraffine once injected, can never be removed except in places where an actual encystment has taken place, in which case the hard mass may be removed through a small incision made directly over the mass and introducing a grooved director into the opening then by the rotation, or to and fro movement of which, combined with digital pressure the cyst is evacuated. Once the mass is replaced by a network of connective tissue it could not be removed except by an extensive dissection and extirpation which leaves behind it cicatrices far worse than the appearance of the parts before operation.

The author injects cold sterile white vaseline, below the skin here and there about the cheek at the sites of deepest deficiency.

These injections may be made under ethyl chloride anesthesia.

Each injection is carried to the extent of causing a lump below the skin, the quantity being judged from a thorough experience with similar cases.

After the injections have all been done, the thumb of the right hand is passed into the mouth against the buccal mucous membrane of the left cheek and the index finger over it externally or on the skin surface. For the right cheek the index finger instead of the thumb is placed in the mouth. The mass or lumps are now gently pressed into the desired shape and thickness by the aid of these two fingers. A few drops of the mass may be forced out of the needle holes under this procedure, but this is of no consequence when it is considered that from one to two ounces may have been injected into each cheek.

This gliding form of massage should be continued until the entire cheek presents an even and rounded out appearance.

It will be found, in the majority of cases, that the integument of the cheeks about the region of the inferior border of the zygomatic process is rather firmly adherent and that a subsequent injection will be necessary to elevate the cheek at that point.

Injections over the malar bone are prone to cause severe reaction leaving a puffed appearance just below the eyelids. This may be more or less permanent and is very undesirable. It should be avoided by injecting very small quantities at that site. It is always safer to add a little subsequently.

The reaction, generally, is not severe and is readily controlled by cold applications, yet the author has experienced considerable swelling and tenderness in two cases of total cheek deficiency corrections which lasted for several weeks after the operation, giving excellent result eventually however. Such symptoms are dependent upon circulatory interference, but resolution should take place without untoward results with judicious treatment, unless the operator has been negligent by injecting one or more blood vessels, in which case the resultant thrombosis may cause breaking down of the subcutaneous tissue, abscess, evacuation of the mass and possibly death in part of the integument. The precautions referred to in avoiding any such possibility have been fully given heretofore.

Never should the operator hyperinject the cheeks, even if the patient insists upon looking like a puffed ball. He should be satisfied with a normal contour and truthfully assure the patient such hyperinjected contour could not be retained owing to the weight and dropping down of the mass before nature could properly replace it by organized tissue.

Subsequent injections may be made about three weeks after the first sitting.

With nervous and hypercritical patients the surgeon may elect to give the patient a number of sittings, injecting only small quantities at two or three places each time. This in the majority of cases will give better results than when an entire cheek is injected, for the reason that the larger mass is likely to be displaced by the unconscious act of the patient in sleeping on one or both of the rebuilt cheeks or the willful massage to improve the handiwork of the surgeon in their own belief.

Massage of the cheeks after the replacement period is not to be tolerated. It tends to create hyperplasia by circulatory stimulation.

It is not unusual to have the patient tell you that for weeks after the replacement period the cheeks are swollen considerably in the morning upon arising, going down gradually during the day.

This is due to the spongy or loose character of the new tissue caused to be formed by the foreign mass which gradually takes on a harder and more compact form.

The post-operative dressing will be either adhesive isinglass plaster or collodion. With the former, moist applications during the stage of reaction are not permissible.

DEFORMITIES ABOUT THE ORBIT

DEFICIENCY OF LID CONTOUR

Upper and Lower Lids—Unilateral and Bilateral.—The lack of contour in the eyelids is not as frequently met with as redundancy of their integumentary structure; there are cases, however,

where the eyes seem to lie deep in their sockets owing to a sinking in or a collapse of the surrounding lids.

This condition is often found to be hereditary, in other cases it is the result of malnutrition, a peculiar lack of adipose tissue about the orbit for no known reason, or fatty degeneration in past middle life.

The fault is usually bilateral. In rare instances trauma about the orbital borders may result in lack of nutrition. Such cases are usually unilateral and the upper lid is affected in the majority of cases.

The correction of these defects is found to be rather difficult owing to the thickness of the tissue under consideration.

The use of hard paraffine plays havoc with eyelid tissue, rendering it hard, immobile and causing a hyperplasia of the new connective tissue formed thereby, as well as the peculiar yellowish pigmentary spots of irregular form resembling on casual inspection xanthlasma. This discoloration has been fully described earlier in the work.

The author has had occasion to remove these hard irregular masses investing the lower lid in several cases where paraffine had been injected, also two cases in which the pigmentary discoloration involved both upper and lower lids associated with the same hard fibrous masses. Excision under local anesthesia and silk suture was the method of correction employed.

From an experience of twenty-two cases the author believes these conditions most amenable for correction by the injection of sterile oils in preference to any other substance. Even white vaseline does not here seem to answer the purpose, owing to its stimulating property of causing the resultant growth of connective tissue.

While vaseline injected in the lids causes less of this new tissue to be formed, such tissue is never of the consistency required. This is especially true of the upper lids.

The oil injected, sterilized sperm oil being employed by the writer, is prone to absorption of more or less degree, but the result is gratifying and lasts from six months to one year, leaving no untoward effect.

If the absorption has been sufficient to leave the parts as before the operation, a subsequent injection of the same character may be undertaken six months from the time of the first or even later as the patient may choose.

The tissue of the eyelid is prone to swell immediately the oil is injected and this swelling is entirely out of proportion to the quantity introduced. This œdema, due to a retardation by pressure of the blood supply, is very misleading, the operator believing the parts overinjected. A screw drop syringe is therefore absolutely required.

A fine hypodermic needle is used and after a few drops of the foreign matter have been injected, the lid should be massaged gently with the tip of the indicis, employing the circular movement.

The injection should be made at the outer end of the lid about one-fourth inch above or below the canthus for upper or lower lid respectively.

The needle, slightly dulled, should be long enough to reach the full length of the part to be injected. Its course can be readily seen under the thin, overlying skin.

As the injection progresses slowly and evenly the needle is withdrawn.

A second puncture or injection should not be made at one

sitting ; if the parts are under-injected the operation is repeated as soon as the swelling of the lid has subsided, which is about the end of the fourth or fifth day.

The reaction, apart from the œdema, is very little, although there may be more or less discoloration of the parts as the result of the obstruction offered the blood vessels.

This is always an alarming symptom to the patient, but passes away completely in the usual manner in several days.

The post-operative dressings may be collodion or silk protective.

Cold or hot applications, as may be best borne by the patient, can be used ; they tend to reduce the puffing and lessen the ecchymosis. The patient should be instructed to lie with the head higher than usual for the first two nights to retard the œdema.

Furrow about Canthus—Unilateral and Bilateral.—This condition is commonly called “Crow’s Feet,” and is, in the majority of cases, due to advancing age, but is acquired by habitually contracting the eyelids, as in laughing or grimacing. It is particularly noticeable in persons employed in the drama.

The defect is usually bilateral, but may exist at one side only in rare cases.

The correction is easily accomplished by this method of subcutaneous injection, although a reduction of the furrow alone does not suffice, leaving a lump or elevation at the site. The author shades off the injection, as it were, making the site somewhat cone-like, the apex being at the canthus and the base outward toward the hair-line of the temporal region.

Sterile oil should be injected near the canthus where the overlying integument is delicate. One such injection, covering an area of the diameter of half to three-fourths of an inch,

should be made and thus backed up or built outward with two or three injections of the white vaseline, as described under temporal muscular deficiency.

The hypodermic needle should be used near the canthus, and the regular one over or about the temple.

The reaction near the canthus is similar to that with lid injections. The same post-operative treatment as with the lids should be employed.

Deficiency of the Ocular Stump.—It frequently happens that by reason of extensive inflammatory disease and adjacent adhesions of the eye, a greater part of the globe must be excised than in the usual case, whether the operation be an ordinary excision, the Mules' evisceration or the Frost modification of the latter.

In such event the granular button or the stump made of Tenon's capsule is too small to permit of the placing and retention of the artificial eye. In other instances the stump is so contracted that while the artificial eye is retained it must of necessity be allowed to rest deep in the socket, destroying the entire contour of the orbit. Again in the enucleation operation so little of Tenon's capsule engages the artificial eye that movement is entirely destroyed, particularly when the Mules' glass globe has not been introduced.

Excellent results may be obtained in some of these cases, others are not amenable to the injection method because of a lack of sufficient stump to inject and the danger of injecting through the posterior wall of the capsule, the mass in part escaping into the orbital apex where it is liable to impinge sufficiently upon the remains of the optic nerve to cause sympathetic inflammation of the normal eye. A condition at once not easily

corrected, proving dangerous to the sight of the healthy eye and possibly producing a fatal termination.

It is with the use of paraffine, liquified by heat and injected in this state, that such fatal cases as have been placed on record have been operated. The liquid mass under pressure forced into a soft pultaceous mass cannot be easily controlled, if at all, and accidents here are of more serious import than in any other part of the human anatomy, apart from the direct injection of a facial artery of sufficient size to produce an alarming embolism and death.

The author cannot speak too forcibly against such irrational procedure. Other surgeons are beginning to realize the danger of the use of hard paraffine injections near the eye.

The proper and safe method of improving the stump is to introduce into it, under local eucaïne or cocaine anesthesia, small masses of the mixture of vaseline and paraffine in cold state. These injections into the stump and mucous membrane should be done several weeks apart, always keeping a respectful distance from the remains of the optic nerve.

The injections should be begun as near to the surface as possible without breaking down the tissue by necrosis, keeping in mind that one or two of such successfully introduced masses will do much toward supporting the artificial eye.

If necessary the mucous membrane back of the palpebral rim can be injected in like manner to give firmer hold to the eye and at the same time give support to the usually depressed and atrophied lids.

Wet dressings are applied to allay the reactive inflammation which should be proportionate in severity to the amount of the mass injected.

In three cases operated upon by the author excellent results were attained and no untoward results had been experienced two years after injection.

DEFORMITIES ABOUT THE CHIN

Anterior and Lateral Deficiencies

An anterior lack of contour of the chin is generally regarded as of the receding type. With this is usually found a bilateral lack of form, especially in men. With a generally well-formed face such a chin gives it a weak and oftentimes a degenerate appearance. In women a deficient chin is not as noticeable, because of the smallness of the face in general and the predomination of the oval type.

The lack of prominence about the chin may be anterior only, the broadness being sufficient, due to a lack of development of the mental process, or it may be deficient laterally with a pronounced mental prominence, giving it a sharp, protruding or pointed appearance, or the lack of form is combined as is commonly the case.

Such chins may be made to appear normal, and even ideal, by the subcutaneous injection method. The type of chin most favored by American men is the square angular, now so plentifully seen in pen and ink illustrations.

The tissue of the chin lends itself readily to the building-up process. Almost any form may be attained by the judicious employment of the method under consideration.

While it is true excellent results may be obtained with hard paraffine, used in liquified form, it can often be shown, however, that the paraffine injected under pressure will run down in



PROFILE VIEW
Showing Correction of Antero-lateral Deficiency About Chin

narrow, pencil-like streams underneath the chin and skin of the anterior aspect of the neck, where they may be felt afterwards as hard oval cysts or of elongated form. This is not possible when the cold mixture of vaseline and paraffine is used, since the position of the mass can be easily followed with the eye or felt with the fingers.

The injections should be made from either angle at the first sitting. Enough of the mass should be introduced to leave a ridge-like formation across the anterior chin, varying in thickness according to the shape of the chin previous to operation and the form desired.

It is not well in chins of very deficient type to attempt to make the anterior contour as it should be in the first sitting. Too much pressure would be required, and unless the skin was freely movable considerable reactive inflammation would result, with possible necrosis of the skin in part and consequent expulsion of the injected mass.

The anterior line of such chins should be rebuilt in several sittings, always waiting for the parts to become normal in appearance and sensitiveness.

This method helps to stretch the skin, allowing of further injections and the introductions of a greater quantity than could be introduced at one time only.

The author advocates making two or three sittings of the anterior restoration of contour and two for each angle.

The angles of the chin are injected at a point about midway between the mental process and beginning of the external oblique line. The mass is injected as near the inferior ridge as possible, and somewhat above the attachment of the platysma myoides muscle.

Only one needle insertion is made at each angle, and the mass is injected until a round elevated tumor is attained, which is pinched or squeezed with the fingers into the desired angular form, one finger being placed over the needle opening to avoid squeezing the mass out.

It can be readily seen that with this putty-like mass much better results than with the comparatively soft vaseline could be obtained while with the liquified paraffine the operator would be at a loss to know just what had been accomplished until the mass had become fairly solidified and then often finding the semi-solid mass, which required rapid moulding to give it the desired shape before it would become hard and unmanageable, in a different position and much more distributed than he had expected.

For the latter reason repeated small injections have been advised, but the author believes oft repeated injections of paraffine in a small area are prone to set up considerable disturbance and that the resultant tissue replacement is interfered with. Furthermore the injected mass would eventually be in grape-bunch like form and in that condition not as manageable or inducive to the establishment of contour angulation such as is required in the chin. The final appearance of chins thus rebuilt is heavy and rounded, lacking the concavity above the inferior prominence along the anterior line as well as the angulation laterally.

With the cold mixture advised a considerable mass may be injected at one sitting which is easily moulded into form and which retains that form unless the reactive inflammation is severe. This should not follow unless actual hyperinjection has been done or an unclean product has set up an infective cellulitis.

When the chin is uncommonly peaked, or small, it may be found necessary to inject both sides of the chin beyond the angle



FRONTAL VIEW

Showing Correction of Antero-lateral Deficiency About Chin
Also Correction of Deficiency of Cheeks

and in an upward direction slightly below and following the external oblique line.

Such deficiency may be found decidedly unilateral as a result of lack of development of one-half of the lower maxillary bone, a resection of either maxilla for whatever cause, imperfect union following fracture or disease of the bone early in life.

In such cases the lateral deficiency must be first restored, using the same method, before the chin proper can be built up. Ofttimes the lower cheek of the affected side must also be injected. This should be done after the site overlying the former body of the maxilla of the affected side has been rebuilt. The cheek should then be built out above this hard linear mass by the injection of cold white vaseline as heretofore referred to.

The following illustrations show a chin deficient anteriorly and laterally before and the result after correction.

The post-operative treatment should be collodion dressing followed by cold antiseptic applications for at least two days. The latter ameliorates the inflammation and helps to retain the moulded shape of the mass. Subsequent sittings may be made one a week or ten days apart.

DEFORMITIES ABOUT THE EAR

Pro-auricular Deficiency—Unilateral and Bilateral.—A deep furrow in front of the ear may be found unilateral in hemiatrophy of the face, but the condition is usually a bilateral one due to malnutrition or the fatty degeneration of past middle age. In the latter case the depression is accompanied by a redundancy and wrinkling of the skin.

Owing to the close proximity of the large temporal vessels a

hard mass should never be injected subcutaneously for the relief of this condition. Even the mixture of vaseline and paraffine has caused considerable reaction when injected to overlie these vessels.

The author advises the injection of white sterile vaseline or sperm oil for this form of correction. It should be carefully injected since the vessels lie close to the skin with the anterior auricular crossing transversely about the center of the furrow.

Every precaution should be taken, one injection only being made from below upward at each sitting if more than one is necessary and then only after the needle has been unscrewed from the syringe to make sure vessel bleeding does not follow the puncture.

The reaction is usually severe with considerable œdema and ecchymosis.

The resultant tissue formation likewise is active and hyperplasia at this site is not uncommon, especially if the mixture or hard paraffine has been employed.

A cellulitis following such an injection is exceedingly troublesome, the injected mass being thrown off usually at the base of the furrow, which is followed by a low type of inflammation with a protracted oozing of serous exudate. Should such a case come under the care of the surgeon, thorough cleansing of the affected site under scrupulous antisepsis should be done at once, and wet antiseptic dressings be applied daily until the wound is entirely healed.

A plastic skin operation must be done in most of these cases to overcome the ragged cicatrix formed upon healing of the wound. This should never be undertaken until the wound has been healed for several weeks at least.

After the injection of the parts cold antiseptic dressings should be applied at once, and kept up until every sign of re-active inflammation has subsided. At no time should the subsequent injection be undertaken before a month has elapsed from the time of the former operation.

Post-auricular Deficiency.—This defect is invariable unilateral, and then the result of a mastoid operation.

The skin about the depressed site will be found to be more or less firmly adherent, necessitating subcutaneous dissection before an injection for correction can be undertaken.

In this case the cold mixture of vaseline and paraffine is indicated since the softer products will hardly suffice to elevate the tense skin. If the former surgical operation has been done some time previous to the required injection the parts may at one or two sittings be restored to a fairly normal contour, depending entirely upon the amount of ungiving scar tissue at the site. If the parts are tender and not reduced to normal, the injections should be made frequently, about ten days apart, injecting a small mass across and through the subcutaneous scar attachment at each sitting.

The reactions following such injections help to tease the scar away from the bony tissue, but should not be sufficient to cause extensive inflammation.

The same mode of post-operative treatment as has been given with pro-auricular corrections should be followed.

DEFORMITIES ABOUT THE SHOULDERS

Deficiencies about the base of the neck and the shoulders are very commonly found in women. These defects are usually bilateral, except in rare cases. The much desired contour is readily restored by the subcutaneous injection method, and since the technic for one part is the same as for the whole there is no need to dilate specifically upon the treatment of each part.

The author advocates the injection of cold sterile white vaseline only, for the restoration of the contour about the neck, anterior and posterior shoulder and the mamnæ, except in the unilateral correction of a flattening of the breast following amputation for the removal of neoplasms, when the mixture of white vaseline and paraffine should be used, owing to the tensesness of the skin following the excision of a large part of the integument covering the diseased gland.

In the restoration of the contour about the neck and shoulders it is well for the surgeon to familiarize himself thoroughly with the superficial veins of the parts, since the vessels here are larger, and the introduction of foreign matter into them is liable to lead to serious and even fatal results.

The injections should never be made until the operator has assured himself of the fact that a vessel has not been entered into, and then only should a small quantity of the mass, i. e., about two or three drams, be injected at one point.

The easiest mode of introducing the needle is to pinch up the skin between the fingers of one hand introducing the needle into the fold thus raised. As the mass is injected the skin should be raised by aid of the needle so as to allow all the immediate room possible for its reception.

The mass injected is at once moulded down flat with the thumb or forefinger.

A number of such injections may be made at both sides at the one sitting. The ethyl chloride spray may be employed to render the parts less painful. At no time should the entire shoulders be filled at one sitting for fear that the reaction may be severe or that for any unforeseen cause infection results which would in such instance be indeed difficult of treatment, eventually leaving the parts scarred and unsightly.

Nor should the mass be injected intracutaneously, a fault sometimes observed about the base line of the neck anteriorly and laterally where the operator has been timid in avoiding the exterior and anterior jugular veins. Such injections invariably result in abscess or when not extensive enough to cause necrosis the skin assumes a more or less permanent red or yellow discoloration over the site so injected.

The treatment for the partial or total removal of such spots has been referred to.

In the average case of contour restoration of the shoulders about eight sittings are required, two sittings being given each week and as many injections made as is deemed necessary or advisable at each.

All the precautions of technic heretofore given should be employed. The reaction following such injections is never severe and little or no treatment is necessary.

The needle openings are covered with aristol-collodion or the isinglass adhesive plaster.

At the end of six months or more after the injected matter has been quite thoroughly replaced with new connective tissue it is often found necessary to inject small quantities here and there about the shoulders owing to the contraction of the new tissue and its ultimate fixed disposition about the parts more than to the absorption of the mass injected.

Furthermore a certain amount of œdema or swelling follows the injection of any foreign matter under the skin which is not, in cases of this kind, so readily absorbed, giving during that period of time a more pronounced contour or fullness, which passing away in the natural course of events does not imply the absorption of the matter injected—a statement so often made by those not in favor of using paraffines of low melting points for subcutaneous protheses.

Such result, however extensive, as it might be in some cases for the lack of proper injection or in the case with oil injections is at all times correctable, while the hyperplastic knobs, so often following the injection of paraffines of high melting points about the shoulder, can only be removed by surgical means which leave the parts more unsightly than before anything had been done for the patient.

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