more manifestations on the skin which have constitutional relations, and which can well be regarded as exhibiting danger signals. I may only briefly mention a few more which have occurred to me; doubtless many more illustrations could be secured with more careful attention. In many of these now mentioned the connection is, of course, well known and commonly recognized.

OTHER SKIN LESIONS AS DANGER SIGNALS.

Purpura rheumatica and erythema nodosum are constantly recognized as dependent on a rheumatic condition, and proper, active anti-rheumatic treatment indicated by this warning may save the patient from more serious trouble.

Petechial and erythematous rashes are not infrequent accompaniments of malignant endocarditis and may occur in connection with septicemia and pyemia. Purpuric lesions are well known to be an important symptom in epidemic cerebrospinal meningitis. Rose spots, especially on the abdomen, have long been recognized as a special sign of value in typhoid fever. Pigmentary alterations in the skin form one of the important diagnostic marks in Addison's, Graves' and Hodgkin's diseases, while myxedema is largely recognized by its manifestations in the skin and subcutaneous tissue.

Sweating and flushing of the skin are frequent accompaniments of the menopause, and may often direct the patient to seek medical relief which may avert other trouble. Dermatitis medicamentosa represents eruptions of varied character which occur on the skin wholly from the internal administration of certain drugs to those who have some peculiar idiosyncrasy. In these cases, if the danger signal is heeded and the drug withdrawn the eruption commonly ceases without further harm.

In this brief and rather hurried sketch of some of what I have designated "danger signals from the skin," I have attempted to show that the skin is not to be regarded as merely an outer covering of the body, but that it is a most important organ, having vital relations with many parts of the economy. It frequently exhibits conditions on its surface which it is well to study patiently, interpret accurately, and heed carefully in order to effect a cure of its diseased condition and also to advance the best interests of the patient.

He, therefore, but poorly serves his patient who hastily regards only the skin lesions (or too often only part of them) and gives some local application without realizing the significance and true cause of what is often a signal flag of danger which Nature offers for his aid.

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TRANSBRACHIAL ANASTOMOSIS.

A NEW METHOD OF SURGICAL TREATMENT FOR BRACHIAL PALSY.*

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The following is a preliminary report of a new method of restoring function to paralyzed nerves, by anastomosis with analogous nerve trunks on the opposite side of the body. The patient herewith presented had an anastomosis between the healthy left brachial plexus and an almost completely paralyzed right brachial plexus, fifteen months after an attack of anterior poliomyelitis. In this case the operation has been followed by no dem-

onstrable injury to the left brachial plexus, but by a rapid and very decided gain of power in the right hand, forearm and shoulder.

The operative treatment of brachial palsy in the past has dealt chiefly with those forms of paralysis in which the lesion involves directly the nerve fibers of the brachial plexus. Thus in brachial birth palsy, and in those forms occurring later in life from traumatism of the plexus, encouraging results have been obtained by excluding, by means of a resection or anastomosis, the damaged and non-conducting areas of the nerve trunks. In these cases the lesion is directly accessible to the knife. The problem is a different one, however, when the brachial plexus is thrown largely out of function from infantile palsy. Here the lesion, situated in the anterior cornu of the cervical segment of the cord, is, for the present at least, beyond surgical access and the possibilities of surgical relief are restricted to anastomoses between functional and paralyzed muscle systems or nerve trunks.

The peculiarities of the individual case, especially the variability of the residual paralysis, prevents uniformity in the surgical treatment. Each patient must be studied as a separate and special surgical problem.

Patient.—The patient was born in November, 1901, and was a perfectly healthy boy until May, 1905, when he had the measles.

History.—In July, 1905, when he was about three and one-half years old, he awoke one morning with a loss of power and tenderness of the right arm. He was feverish, at times delirious, had epistaxis, and two days later it was noticed that there was also diminished power in the legs, although the right arm was chiefly involved. For four weeks the tenderness persisted in the arm and frequently seemed to cause the patient to awake screaming during the night. After five weeks the paralysis of the legs gradually disappeared, but progressive wasting of the right arm and shoulder was noticed. Two or three months after the onset of the palsy he entered a hospital and was treated two weeks by massage. Later, he was under osteopathic treatment for five months, but without decided benefit. On Oct. 26, 1906, fifteen months after the development of the paralysis, he entered the Samaritan Hospital. At this time there was no wasting or palsy of the legs or left arm, but the right arm and shoulder were wasted and useless. The deltoid, trapezius, rhomboid, scapular and pectoral muscles were atrophied and functionless, and as a result there was marked dropping of the right shoulder. The muscles and bones of the arms were wasted, the hand was never used, but was carried from place to place by the opposite hand. There was a slight development of some of the extensors and pronators of the forearm, and only slight power of extension of the wrist and pronation of the hand. Sensation was uninvolved. In considering the problem offered in this case, as a surgical one, we could conceive of five possible procedures as follows:

1. Muscular or tendinous transference and anastomosis: The very feeble power limited to certain extensors and pronators of the forearm caused this method of treatment at once to be rejected.

2. An anastomosis between nerves of the brachial plexus containing functioning fibers and adjacent non-functionating cords: Here again the extent of the palsy and the difficulty in isolating active fibers made the method seem of little promise.

3. An anastomosis between branches of the brachial plexus and adjacent cervical or dorsal nerves carrying motor fibers: The small size of the cervical and dorsal motor nerves, and especially the fact that they were to some degree implicated in the palsy, caused this method to be rejected as inadvisable.

4. An anastomosis between the brachial plexus and one or more of the motor cranial nerves: Of the cranial nerves, only two seemed to be available—the spinal accessory and the hypoglossal. The shoulder drop and the paralysis of the trapezius indicated an implication of the former and the hypoglossal,

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therefore, was chiefly considered; it was not until the patient was on the operating table that the thought of its use was finally abandoned. The relatively small size of the nerve, its distance from the brachial plexus, rendering it necessary to adopt some method of bridging if it were used, and the technical difficulties involved in isolating any considerable length of the nerve, were objections to the use of the hypoglossal.

5. Finally, the possibility of securing an anastomotic segment from the opposite brachial plexus was considered: The chief objections to a transbrachial anastomosis seemed to be the difficulty of securing sufficient lengths of nerve to form a bridge across the neck and the danger of damaging the healthy plexus. We had had some previous experience in splitting nerve trunks and using the split portion for anastomosis (in one case carrying half of the sciatic nerve through the thigh and anastomosing it to branches of the anterior crural nerve), and in this present case it was determined, by splitting segments from each brachial plexus, to attempt to secure sufficient lengths of nerve fibers for anastomosis in the median line of the neck.

Operation.—Oct. 27, 1906. The patient being under ether the right brachial plexus was exposed from a point just above the clavicle to the region where the nerve trunks emerge from between the scalenus anticus and the medius muscles. The sixth cervical nerve seemed especially wasted and atrophic. It was divided in half close to its point of emergence and by delicate dissection half of the nerve trunk was isolated from above downward. This separation was carried into the adjacent anastomosing nerve trunks. In this way two nerve cords of fair size were separated down to a point slightly above the clavicle. The left brachial plexus was then exposed, the prolongation of the sixth cervical divided nearly in half close to the clavicle, and a bundle of nerve fibers about two inches in length isolated by splitting the nerve trunk from below upward. A small transverse incision was then made above the suprasternal notch, and canals were bluntly tunnelled through between the anterior muscles of the neck and trachea, connecting the lateral with the median incisions, then the free ends of the separated nerve bundles were gently brought through into the median incision and united in an end-to-end manner by very fine chromicized catgut. Thus a bridge of nerve fibers was formed between the two brachial plexuses, having a central attachment on the left and peripheral attachments on the right side. The union was reinforced by forming a partial fascial sheath about the point of nerve union, and all three wounds carefully closed in layers without drains. Following the operation, the child developed some tenderness and pain along the chief nerve trunks of the right arm, which gradually subsided. The left arm was studied with considerable apprehension, but no disability or nerve disturbance was at any time discovered.

Postoperative History.—At the end of a week there was a slight suggestion of new power of the hand. The child was discharged from the hospital on the eleventh day, and since then has been without electricity or skilled massage. It is now (February) three and one-half months since the operation, and the child already shows an improvement far beyond expectations. The nutrition of the arm is good, the forearm has increased one-half inch in circumference and the upper arm one-quarter inch. The power of extension which was limited to the wrist, is now possessed by all the fingers. The child can partially flex the wrist and all the fingers and thumb; and abduction and adduction of all the digits has been gained. Pronation of the hand remains and there is some power of supination. The shoulder-drop has disappeared and the shoulder can be elevated, carried forward or backward at will. There is excellent power of rotation at the shoulder joint, especially inward rotation. A marked development of the scapular muscles, the trapezius and the pectorals has occurred. The paralysis and atrophy of the deltoid and upper arm muscles persist. The child is able to support the body against the extended arm and uses the hand constantly in grasping objects and in aiding the opposite hand.

Theoretically, we can conceive three methods in which the operation in this case may have restored function.

First.—The splitting of nerve trunks reduces the pressure on individual nerve fibers, permitting the escape of any abnormal exudate from within the nerve sheath. Thus in certain cases of neuritis relief from pain has been obtained and some immediate restoration of function by splitting the sheaths of the involved nerves, and in separating the nerve fibers. As the primary lesions in the present case seems clearly to have been a lesion in the cord, a relief of tension of the nerves is not a reasonable explanation of the restoration of function.

Second.—In the splitting of nerve trunks, no matter how accurately it be done, it is probable that many nerve fibers are divided. If the nerve contain functional as well as degenerated fibers there is a possibility of a readjustment of function through new anastomoses of liberated and divided nerve ends. Within certain limits it is conceivable that the more extensively the nerve fibers are divided from each other, the greater the opportunities for new and perhaps better anastomoses. This we consider to be an explanation of a part of the widespread improvement which has occurred in the present case, but it is difficult to conceive that, in a plexus so extensively paralyzed, this alone would be sufficient to give so marked restoration in power, without invoking other factors.

Third.—The formation of new nerve paths from the left into the paralyzed right brachial plexus, which have been given a wider field of action by the freeing of innumerable fibers in complex nerve trunks by the extensive splitting of nerve bundles, has probably been the chief factor in the restoration of power in the present case. This preliminary report, therefore, is offered as proving the technical possibility of transbrachial anastomosis and as suggesting the desirability of a more extended trial of the method in certain cases of brachial palsy not amenable to treatment by milder measures.

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THE STANDARDIZATION OF CARDIAC REMEDIES.*

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Within the past two or three years there has been a great revival of interest in problems connected with the use of drugs in the treatment of disease, and several factors are responsible for this change of attitude. The appearance of the new Pharmacopeia, causing as it did many discussions in regard to the admission of new remedies and the changing of the standards of some of the older preparations, could not fail to awaken a more or less widespread interest. Another important influence has been the warfare begun by the *Ladies' Home Journal* and *Collier's Weekly* against the sale and use of all forms of nostrums and quack remedies. The crusade has been taken up by several other lay papers and by a very few medical publications, most prominent among the latter being THE JOURNAL of the American Medical Association. This Association has also played an important part in other ways, viz., through the work of its Council on Pharmacy and Chemistry it has exposed the false claims of many of the much-vaunted remedies and by its articles on "The Physician and the Pharmacopeia" it has aided the practitioner in becoming better acquainted with the possibilities to be found among the "official" remedies.

*From the Pharmacological Laboratory of the University of Michigan.