seem properly to belong here. A greater susceptibility to cerebral trauma may have existed however in these two cases.

Twenty-two of the children were perfectly well until the onset of meningitis or encephalitis, during the convalescence, or following the recovery from which epilepsy appeared. Six of these children were feeble minded and 6 were hemiplegic.

Five cases could be traced to an attack of pertussis, in two instances at the age of a few weeks, in one at sixteen months, and in two at two years. One was hemiplegic and one had strabismus. If these cases owe their origin to pertussis as seems probable, the damage to the brain was undoubtedly circulatory not toxic. In a somewhat different class are the next four cases which originated from infections, two during dysentery, the others following diphtheria and measles. It is somewhat difficult to determine the manner in which the cerebral trauma was caused. In one of the dysentery cases the severity of the symptoms indicate meningo-encephalitis, the 2½ year old child having lain for eight days unconscious, with retracted head. None of these children were spastic, one had deteriorated mentally since the measles, was under observation seven years, and finally committed to an institution.

In 53 cases no definite etiology could be determined. 23 presented evidence of cerebral defect other than the epilepsy, 14 feeble minded, (several showed cranial deformity) 7 hemiplegic, 1 paraplegic and 1 hydrocephalic. Thus a considerable number of these otherwise unexplained cases presented objective evidence of cerebral defect or deficiency, the result of trauma or disease.

The study of these 175 cases confirms an opinion I have held for many years, as the result of the observation of many hundred epileptic children, that heredity is a minor factor in the etiology of epilepsy, whenever the disease is studied at such an age that the true details of the past and family history of the victim can be obtained. These data are obtainable in the case of children to an infinitely greater extent than when the disease is investigated only in adults. Both the data and physical examination of epileptic children indicate that the affection in the majority of instances is the result of acquired cerebral injury from trauma or disease.

XIV.

HEMORRHAGE FOLLOWING TONSILLECTOMY.

By F. E. GARLAND, M.D.,

AND

D. CROSBY GREENE, M.D.

THERE is a wide variance of opinion among medical men in regard to the frequency of

hemorrhage after tonsillectomy. Some men of large experience report but one or two cases of hemorrhage in a thousand cases operated upon. Others, who have done an equal amount of work put the number much higher,—one hemorrhage to very hundred, or even fifty, tonsil operations.

There are several ways of explaining this diversity of opinion. In the first place, those who operate mainly on adults, will have more bleeding cases than those whose work is confined chiefly to children. Secondly, what by one man would be considered an alarming bleeding, would be regarded by another operator as a necessary incident of the operation. Thirdly, hemorrhage cases are not by any means always fatal, and often escape the notice of the operator. He perhaps notes that the patient is very pale for several weeks following the operation, but the true cause is not suspected.

Why one case bleeds and another does not is a perplexing question. One thing is certain, however, and that is that the bleeding is not necessarily due to excessive trauma or careless cutting of the constrictor muscle. In practically all of the cases we have seen, which number about one hundred, the bleeding has occurred following easy operations where the tonsillar fossae and pillars of the palate remained entirely intact. A possible explanation, which we have been unable to verify, is this: there is often noted in the fossa after removing a tonsil, a plexus of small veins due possibly to chronic inflammation. It is possible to conceive of the knife or snare splitting open one of these veins longitudinally so that in the movements of the throat, the forming clot is continuously expelled from the remaining part of the vein, and bleeding is produced.

Be this as it may, it seems to us that the bleeding is more often venous than arterial. Small arteries which are seen pumping in a throat just after removing the tonsil, usually cease bleeding in a few minutes and do not require ligating.

The dangerous type of bleeding, the kind which goes on to exsanguination and death, may be described as an ooze. This continues for hours without giving any of the test-book symptoms of hemorrhage. The blood may be expelled by coughing, but the half-conscious patient more often swallows it. Accordingly, unless vomiting occurs, hemorrhage may continue without the slightest evidence. We have recently seen such a case in which the nurse, of more than average experience, did not detect bleeding until ten hours after operation. She noticed that the patient, a child, swallowed frequently, but not until a large quantity of blood was expelled from the stomach did she realize the danger.

This, then, is an alarming situation. If we wait for the marked symptoms of hemorrhage, our patient's condition is very serious, and we should occasionally have a fatality. Such a condition is absolutely unwarranted. Death from hemorrhage ought never to occur. We believe that safety from this danger lies in a careful

inspection of the patient's throat at intervals after operation. Although such inspection may not disclose the actual bleeding point, owing, in the first place to the obvious difficulties in the way of obtaining a good view of a semi-conscious patient's throat, and secondly, the fact that the bleeding may be low in the fossa and thus escape detection, there is one sign which is un-failing in these cases, and that is a clot which forms in the fossa above the bleeding point. This clot is always present, and its presence is sufficient evidence of bleeding. When removed it quickly reforms. This danger signal appears at the beginning of the bleeding, and not as most signs do, when death is near. By careful observation of the throat and an early detection of the clot, we are enabled to deal immediately with the situation. We do not wait for other signs, but at once reapply our ether, and suture the pillars. This process takes about three minutes, and as but little blood is lost, the patient's recovery proceeds in the usual manner.

XV.

POLIOMYELITIS. OPERATIVE TREATMENT.

By ROBERT SOUTER, M.D.

Most of the cases of poliomyelitis fortunately can be helped by simple means such as active and passive exercises and massage, muscle training, temporary braces, mechanical stretching etc. The many cases that require operation form but a small group when compared to the total number of cases treated by other methods. Where simple methods of treatment are not sufficient muscle and tendon transplantation are often of great value.

Nicolodoni was the first to introduce this method in the treatment of poliomyelitis. Since then many operations have been devised to supplant and improve muscle and tendon transference so that today the cripple can not only be relieved of his deformity but many useful operations have been originated and developed which aid in his locomotion.

The relief of deformity is important and must not be lost sight of. Operations for the increase of function should next be considered. These operations are applicable to all cases of misdirected muscular action, whether due to trauma, to cerebral paralysis, to paraplegia, to poliomyelitis or to congenital deformities. Some of these operations of temporary value are done to allow the weak or partially paralyzed muscle to regain its strength or to prevent deformity and contractures during the process. Skin flap and silk ligaments are operations of this class. The value of an operation in poliomyelitis may be better understood

if we group the types of cases according to the paralysis remaining. Omitting those cases that recover completely from their temporary paralysis we have five classes; Those that may obtain a return of function by muscle training; those where a restoration of joint balance requires a redistribution of the muscles by a tendon or muscle transference; Those where the balance is so upset that a transference, while it may take up the lacking motion and lacking antagonism, is not sufficient to keep a lateral balance. In this type silk ligaments, astragalectomies, arthrodesis or other operations may be used. Again we have a class in which there are muscles not paralyzed but not of sufficient number or strength to allow a division and transfer. In this type the joint may be balanced by silk ligaments and the remaining muscles become useful in part or the whole of their arc of motion. Today even when the paralysis is complete about a joint much may be done by skin flap, periosteal flap, silk ligaments or some other plastic operation such as arthrodesis or in the case of an ankle, astragalectomy.

The material we work with in poliomyelitis is often so poor that it is really remarkable to get the results we do. The trophic disturbance is often such that healing and firm union of the soft tissues takes much longer; resistance to infection is less, the slightest pressure during healing affects the result, poor approximation of the tissues is paid for by very slow, granulating wounds, the latter may remain granulating for weeks and then heal, all the time inviting infection. While infection is not common, the most scrupulous care in detail is required of these cases and more precautions are necessary than in the usual operation. The incision should be as small and vertical as possible and made with care, both as to the manner of penetrating the skin layer and as to the direction of the vessels.

In the early years of transplantation there were many failures and some that seemed good at first later were not satisfactory. This was accounted for by the fact that a tendon to tendon transfer was the rule. The good tendon stretched out the weak insertion and the power of motion became lost. Tendinous insertion is preferable where it may be done. This method is advocated by Vulpius. Periosteal insertion obviates many of our difficulties. Since the introduction of silk as a tendon by Lange in 1902 this method of tendon elongation with its periosteal, sub-periosteal and even bone attachment has relieved the cause of many of the previous failures. The silk acts as a good tendon and about it a firm cylinder of fibrous tissue forms which re-enforces the silk and acts as a tendon in itself. There are few operations where technique is of more importance than in tendon or muscle transference and silk ligaments. The action of the muscles must be well understood and carefully tested; the operation