and lepto-meningitis and cerebral abscess, temporary or permanent facial paralysis, etc., etc.

The operation most frequently required is the opening of the mastoid. In acute cases, each must be treated on its own merits. For chronic cases typical methods of operating have been devised. The speaker had for the last three years regularly closed the wound behind the auricle, all except the lower angle, at once. This primary closure of the wound he had adopted even in dealing with large cholesteatomata, and had obtained perfectly satisfactory results. The object of the operation is to unite into one large cavity the meatus, tympanum, attic, antrum, mastoid cells, and external mastoid wound. The cavity thus formed gets covered over with epidermis instead of mucous membrane, and can retain neither pus nor cholesteatoma. Of fifty-one chronic cases operated on by the speaker during the last sixteen months, thirty were cases of caries or sequestrum formation, twenty-one of cholesteatoma. *Arthur J. Hutchison* (*Trans.*).

ANNOTATION.

SHORT NOTES OF CASES.

WE would direct the attention of our subscribers and contributors to the value possessed by short notes of cases, as exemplified in this month's issue. It is often very difficult to bring notes of cases forward at societies' meetings—either one is busy, or prevented, maybe, by some other reason, such as the difficulty of presenting the patient. And it is a great pity that valuable material should be lost in private archives, and not put on record, even though they be presented in a bald and somewhat unvarnished state. Especially useful are series of cases reduced almost to a tabular form, as they are available for easy reference. These short notes have also the advantage to the writer that he is enabled to dispose of the laborious task of looking up references, one which must be one of the causes of the want of reports on interesting cases.

ABSTRACTS.

DIPHTHERIA, &c.

Blumenthal, F.—*On the Possibility of Forming Diphtheria Toxins from Albumens and from Nutrient Media containing Sugar.* "Deutsche Med. Woch.," June 10, 1897.

AFTER referring to previous observations and experiments on the formation of toxins in albumens and the inhibitory action of carbo-hydrates on this process, the author proceeds to describe some of his later researches on diphtheria-toxin formation.

One set of experiments with weak alkaline solutions of egg and serum albumen proved that, though in many cases the bacteria grew very richly, they produced no toxins. As it was possible that, although the bacteria did not use albumen in forming toxins, they might be able to make use of albuminoid bodies, a second series of experiments was undertaken. Nutrient media of Witte's peptone, of casein, of antipeptone, and of nuclein, were tried, but always with negative results. Control experiments with peptone-bouillon always gave positive results. The decomposition of this medium took generally about seven days.

Observations on the formation of toxins in milk (*e.g.*, Feinberg's experiments on cholera toxins) seemed to show that the formation of lactic acid out of sugar of milk had an inhibitory action on the formation of toxins. The author, therefore, next proceeded to investigate the influence of pure sugar on the formation of diphtheria toxin by growing virulent cultures of bacillus diphtheriæ in pure solutions of sugar. The growth of the bacillus in from one per cent. to two per cent. solutions of grape and of milk sugar was extraordinary, but no toxins were produced. Thus the sugar seemed in some way to be able to turn all the energies of the bacillus to simple increase, leaving none for the formation of toxins. To test this further another series of experiments was carried out. Three vessels, containing seventy-five cubic centimètres each of alkaline peptone-bouillon, were taken. To No. I. were added fifty cubic centimètres of a five per cent. grape sugar solution; to No. II. fifty cubic centimètres of a five per cent. milk sugar solution; and to No. III. fifty cubic centimètres of water. These were then inoculated with bacillus diphtheriæ, and after five days were sterilized, treated with chloroform and cold, then filtered. The filtrates were then injected into guinea-pigs. Three guinea-pigs were injected with 0·5 cubic centimètres of the filtrates. Those injected with Nos. I. and II. remained quite healthy. That injected with No. III. died in seventeen hours. *Post-mortem* typical. Again, one guinea-pig was injected with two cubic centimètres of No. I.; one guinea-pig with two cubic centimètres of No. II.; one guinea-pig with 0·2 cubic centimètres of No. III. The first two remained healthy; the third died in two days. *Post-mortem* typical.

Again, guinea-pig (*a*) injected with three cubic centimètres of No. I.; guinea-pig (*b*) injected with three cubic centimètres of No. II.; guinea-pig (*c*) injected with 0·1 cubic centimètres of No. III. (*a*) and (*b*) remained healthy; (*c*) died in three and a half days. *Post-mortem* typical.

The amount of sugar required to inhibit the toxin formation was then investigated. "When the peptone-bouillon contained one per cent. or more of sugar no formation of toxin could be noted within five days—*i.e.*, up to four cubic centimètres injected into the peritoneum of guinea-pigs remained without effect; whereas 0·1 cubic centimètre of the sugar-free sterile peptone-bouillon always killed a guinea-pig of 250 gr. in three to six days in the typical manner."

The growth of the bacillus was in no way hindered by the addition of sugar—rather seemed increased—and there was always a formation of acid in the bouillon and sugar solutions, which never took place in the pure peptone-bouillon.

It is, therefore, possible by adding sugar (a carbo-hydrate) to peptone-bouillon to prevent the formation of diphtheria toxin without hindering the growth of the bacillus. *Arthur J. Hutchison.*

Damieno, A.—*One Hundred Cases of Diphtheria treated with Antitoxic Serum.* "Arch. Ital. di Otol., Rinol., e Laringol.," Avril, 1897.

THESE one hundred cases, selected amongst one hundred and eighteen observed by Massei and Damieno in about two years in private, may be thus divided: fifty of croup and fifty of pharyngeal diphtheria. The mortality has been ten for one hundred in these latter; of twenty-eight for one hundred in the first. Amongst

the fifty cases of croup intubation was necessary in twenty-six. Once only tracheotomy was done after intubation, which did not relieve dyspnœa. Amongst these (twenty-seven cases) eighteen recoveries and nine deaths.

The observations made by the author show evidently not only the wonderful power of antitoxin, but also that failures were due to a late administration of the remedy, or to denied permission to perform intubation in cases where the first indication was the duty of improving breathing.

Bacteriological examinations put out of doubt the exactitude of the diagnosis, and a comparison with the results of a long practice anterior to the serum discovery and intubation, demonstrate that really at present we cannot hope for better results in the treatment of diphtheria, if we arrive in time. *Masseï.*

Levi, A.—*A Case of Hemiplegia Cerebralis following Diphtheria.* "Archiv für Kinderheilk.," Band XXII., Heft 1 and 11.

A FULL account is first given of the case; then the question of the nature of hemiplegia following diphtheria is considered.

Anna Sebag, six years old, suffered from a severe attack of what Monti calls "gangrenous diphtheria," during which she developed an endocarditis acuta, otitis suppurativa, abscess in neck, paralysis of palate, pupil, etc. Towards mid-day, 17th March, sudden apoplectic seizure, with consecutive left-sided paresis of face, upper and lower limbs. After a few hours the paresis gradually disappeared, leaving only a slight weakness of the parts involved. 19th March: second apoplectiform seizure, more violent than the first—the same parts paralyzed as last time, but the paralysis was more marked and did not pass off. In the next few days the facial paralysis gradually diminished, but that of the limbs remained unchanged. 28th March: acute increase of the paralysis, involving the muscles of trunk and neck. At this time the patient had two independent groups of paralysis. On the one hand was paralysis of pupil, palate, trunk, and neck; on the other, the paralysis of the face and limbs. Sensation and reflexes specially weak on the affected side. Gradually the paralysis of the trunk, then that of limbs, passed off, leaving only a slight degree of weakness and stiffness in the left arm.

Bacteriological examination of the membranes from throat and nose revealed Loeffler's bacillus in great numbers; also strepto- and staphylococci, and some larger cocci in groups. Threads of leptothrix and decomposition bacteria were also present.

The author has found records of only thirty-four cases of diphtheritic hemiplegia; so that the disease is certainly to be regarded as a great rarity, specially when contrasted with the great commonness of other forms of paralysis following diphtheria—*e.g.*, paralysis of palate, of eye muscles, and even of groups of muscles in the limbs.

The question then arises, Wherein does diphtheritic hemiplegia differ from ordinary hemiplegias on the one hand, and from the commoner forms of diphtheritic paralysis on the other?

It seems fairly well decided that ordinary diphtheritic paralysis is a peripheral paralysis, and that any changes found in the cells of the cord are to be regarded as the result of an ascending neuritis, but not as a poliomyelitis.

In the cases of diphtheritic hemiplegia, however, the causes of the paralysis are found to be those common to ordinary hemiplegias in the adult. Thus, of the thirty-four cases recorded, seven were ascribed to hæmorrhage, fourteen to embolism; in the remaining thirteen the diagnosis is not quite clear. In the six cases which were examined *post mortem*, one was due to hæmorrhage and five to embolism.

Some hold (Apolant, Oertel) that these hæmorrhages are not to be classed with the hæmorrhages of ordinary hemiplegia, but rather with the small hæmorrhages found in the peripheral nerves and centres in ordinary diphtheritic paralysis—that the difference is one of quantity rather than of quality. On the other hand, Henoch, Remak, etc., place diphtheritic paralysis and diphtheritic hemiplegia in two separate classes.

As for embolisms, no one can regard them as in any way peculiar to diphtheria; endocarditis, or simple cardiac weakness, from whatever cause, will produce emboli. According to Thomas, there is a third cause of diphtheritic hemiplegia—viz., primary thrombosis of the cerebral vessels. The author considers that his case must probably be classed in this category—viz., hemiplegia from thrombosis of the right arteria fossæ Sylvii. *Arthur J. Hutchison.*

Sanor, D. G. (Malvern, Ohio).—*Case of Diphtheria in an Infant Nine Days Old.* "New York Med. Journ.," June 26, 1897.

THE mother had well-marked diphtheria for some days before her confinement, and died the day following parturition. The father, grandmother, and infant all developed diphtheritic symptoms more or less severe within eight days. The infant was unable to take any nourishment from blocking of the nose and throat by exudations. Antitoxin was administered three times in twenty-four hours (viz., one hundred and one hundred and fifty units, Mulford's potent antitoxin) with immediate improvement and subsequent recovery, with the exception of some slight paralysis of the muscles of deglutition. The father was treated by ordinary remedies, and the grandmother with those supplemented by one administration of antitoxin. Both recovered. The author suggests the possibility of intrauterine infection in the infant's case. *Sandford.*

Shurley, B. R.—*Immunization with Antitoxin.* "Arch. Ped.," June, 1897.

IMMUNITY may, natural or artificial, be acquired. The latter may be obtained by: (1) inoculation with a virulent culture; (2) introduction of ptomaines or toxins into the system; (3) inoculation of attenuated virus. The following are the most extensive reports of the application of antitoxin in this direction. Biggs at the New York Infant Asylum; Morill at the Children's Hospital, Boston, 438 immunizations and no catastrophe; Roux, 128; New York Board of Health, 15,986, with one fatality; Holt, at the Nursery and Child's Hospital, New York, 110; Behring, 10,000 cases; author, 44—one child seriously ill with malaria; died. The dosage was as follows, much after that of Holt:—

1 to 3 months	50 units.
3 ,, 4 ,,	75 ,,
4 ,, 6 ,,	100 ,,
6 ,, 12 ,,	150 ,,
1 ,, 2 years	175 ,,
2 ,, 4 ,,	200 ,,
Adults, *mostly pregnant women*	400 ,,

Summary.—(1) Previous prophylactic measures have failed. (2) Immunity acquired after diphtheria cannot be increased by antitoxin. (3) Immunity is immediate. (4) Fresh serum immunizes for thirteen days. (5) Injections to be omitted in serious illnesses. (6) Other acute disorders are not affected by the serum. (7) Reaction is slight. *Lake.*