therefore is applicable to cases in which the symptoms may be caused either by whole or split foreign protein. The milder cases of asthma are probably associated with the latter, clinical evidence for which has already been recorded, and one attack affords little or no protection. A good example of the same thing is afforded in the malarial paroxysm. In many of the severe cases of asthma no doubt a larger molecule operates which is antigenic, and is succeeded by a period of desensitization. In either case protection confers on the body fluids a resistance to the induced poison, when used either in small immunizing doses, or in one dose large enough to produce a definite reaction.

Non-specific immunization does not possess the independence of action which is the prerogative of the specific (in the bacteriological sense). Hence the necessity during treatment of a carefully regulated mode of life. This comprises strict moderation in diet, and, above all, abstinence from alcoholic stimulants, the avoidance of chills, the avoidance of any exercise entailing a marked degree of hyperpnoea, and of anything which raises the normal body temperature, as hot baths of any kind. The patient should go to bed early, and ought not to indulge in social or other excitements, or in changes of residence. After the treatment, preventive measures will naturally be thought of in relation to many of the cases. The protein poison has been found to pertain to the acidic portion of the molecule, and its effects are to some extent neutralized by the simultaneous introduction into the body of alkali. A course of mildly alkaline treatment by natural waters or otherwise from time to time may therefore prove of some service as a prophylactic.

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THE MYOCLONIC FORM OF EPIDEMIC ENCEPHALITIS.

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THE systematic and comparative study of many cases of encephalitis in the principal hospital in Milan enables us to state that besides the classical form of lethargic encephalitis, in which lethargy, fever, and ocular paralysis are the cardinal symptoms, other clinical varieties, less frequent and greatly different, are to be recognized. We can sometimes observe cases in which the symptoms are not lethargy, but excitement, delirium, and myoclonic contractions.

The two following cases are of this second or myoclonic type:

CASE I.

A girl, aged 19, entered the hospital on January 21st last. No hereditary antecedents; she had had influenza with bronchopneumonia in October, 1918, and typhoid fever in January, 1919. On January 17th she began to feel great pain in the muscles of the neck and shoulders, and a few days later she had fever and delirium.

The symptoms present were: Slight cyanosis of the face, injection of the ocular conjunctiva, irregular contractions of the hands, and delirium; the temperature was 38.2° C., the pulse 104, and the respirations were 25; arterial blood pressure 145 mm. (Riva-Rocci). No paralysis of the eyes nor of the cranial nerves. Pupil reflexes to light and to accommodation present and well maintained.* Cutaneous and tendon reflexes normal. A lumbar puncture gave the following result: Liquid perfectly clear, at almost normal pressure; albumin just noticeable; Nonne and Boveri's reactions negative; six lymphocytes per cubic millimetre (Cellule de Nageotte). Cultures from the blood and cerebro-spinal fluid gave negative results.

The patient remained in this condition for about ten days. On February 4th there appeared in the flexor muscles of the arm and of the hand and fingers on both sides, but mostly on the right side, short rhythmic contractions at the rate of 66 to 68 per minute. In the right thigh a contraction of the quadriceps was observed, which produced attempts at flexion of the hip. No sensory troubles were present. Two days later, to the above movements were added slight inspiratory contractions of the diaphragm, synchronizing with the contractions of the arm. These movements continued even during sleep. There was no lethargy. The pupillary reflexes to light

and to accommodation were always regular and no paralysis of the cranial nerves was demonstrable.

This is still the condition of the patient, who at present has pain in the arms.

CASE II.

A woman, aged 40, entered hospital on February 16th last. No hereditary antecedents; no history of influenza. On January 25th there had been great pain in the left arm and shoulder, passing to the right side and the abdominal wall. Shortly afterwards rapid and rhythmical muscular contractions appeared which convulsed the patient. There was delirium, with slight fever; no lethargy, no affection of ocular motion nor of sight.

On entering the hospital this woman, who was of average physical development and well nourished, presented a curious and striking symptom-complex. The right sterno-cleido-mastoid and trapezius muscles and the diaphragm exhibited rhythmic contractions, forty-eight per minute. She perspired freely, and was agitated and delirious. No paralysis of the ocular and cranial nerves. No symptoms in the lower limbs. All reflexes normal. Lumbar puncture gave clear liquid, with increased pressure; albumin 0.2 per cent. Nonne and Boveri's reactions negative; five elements per cubic millimetre (Cellule de Nageotte); temperature 37.8° to 38° C.

Five days later the contractions of the neck ceased; at the same time strong rhythmic contractions, which never for a moment left the patient, appeared in the abdominal wall. Synchronizing with the abdominal and diaphragmatic convulsions, the right thigh presented rhythmic contractions of the abductor muscles and sometimes of the sartorius. Such is the patient's condition at present. All these muscles are painful, as well as the back and the whole arm.

The striking symptom in these two cases was the presence of myoclonic movements, both rhythmic and partial, as though produced by an electric current.

We can therefore speak of a myoclonic type differing from the lethargic type, for a certain period of the disease at least. Thus, while waiting for etiological enlightenment we should speak of epidemic encephalitis in general, and should divide it into lethargic and myoclonic types according to the different symptoms noted.

This myoclonic form of encephalitis naturally leads us to ask whether we are in the presence of the disease described by Dubini,¹ and called by him "electric chorea." It has not been mentioned since his time (1840-1870). He presented to the seventh meeting of Italian scientists (1846) a memorandum describing a new disease of which he had studied 38 cases in a period of nine years. "It is," Dubini writes, "nearly always a fatal disease," characterized "by muscular contractions occurring at different intervals, but always identical in each case, as if produced by a repeated electric current. These convulsions affect at first a finger or limb (more frequently the right upper limb) or one-half of the face (the right) and in a few days invade the whole of that side of the body." Dubini added that, in addition to these rhythmic movements, convulsive attacks might occur two or three or even more times a day, giving way afterwards to paresis and paralysis. Dubini's description was followed by those of Frua,² Morganti,³ Pignacca,⁴ Stefanini,⁵ Behrend,⁶ and, later, Grocco,⁷ 1884.

However accurate were the observations made by these scientists in the middle of the last century, the limited pathological knowledge which then existed did not enable them fully to appreciate their significance; reading to-day all these memoranda, we see described under the name of Dubini's disease a great number of cases which could better be classed as typhoid or malarial fevers, or Jacksonian epilepsies. Apart from this question, it seems to us that Dubini's disease might be connected with the myoclonic form of epidemic encephalitis as we see it at present.

The difference of the symptoms seen in the lethargic and the myoclonic types suggests a different pathological localization of the virus. In the lethargic form the encephalitis is localized particularly in the regions of the cerebral peduncles and the locus niger. It is a question whether in the myoclonic type the centres of infection might not in different degrees and in a transitory manner be localized in the optic thalamus.

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* See P. Boveri, Société de Neurologie de Paris, March 4, 1920. It is there stated that in the lethargic form of encephalitis one of the first and most important signs is the paralysis of pupillary accommodation, while the reflex to light may be maintained.