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With the authors'  
best regards

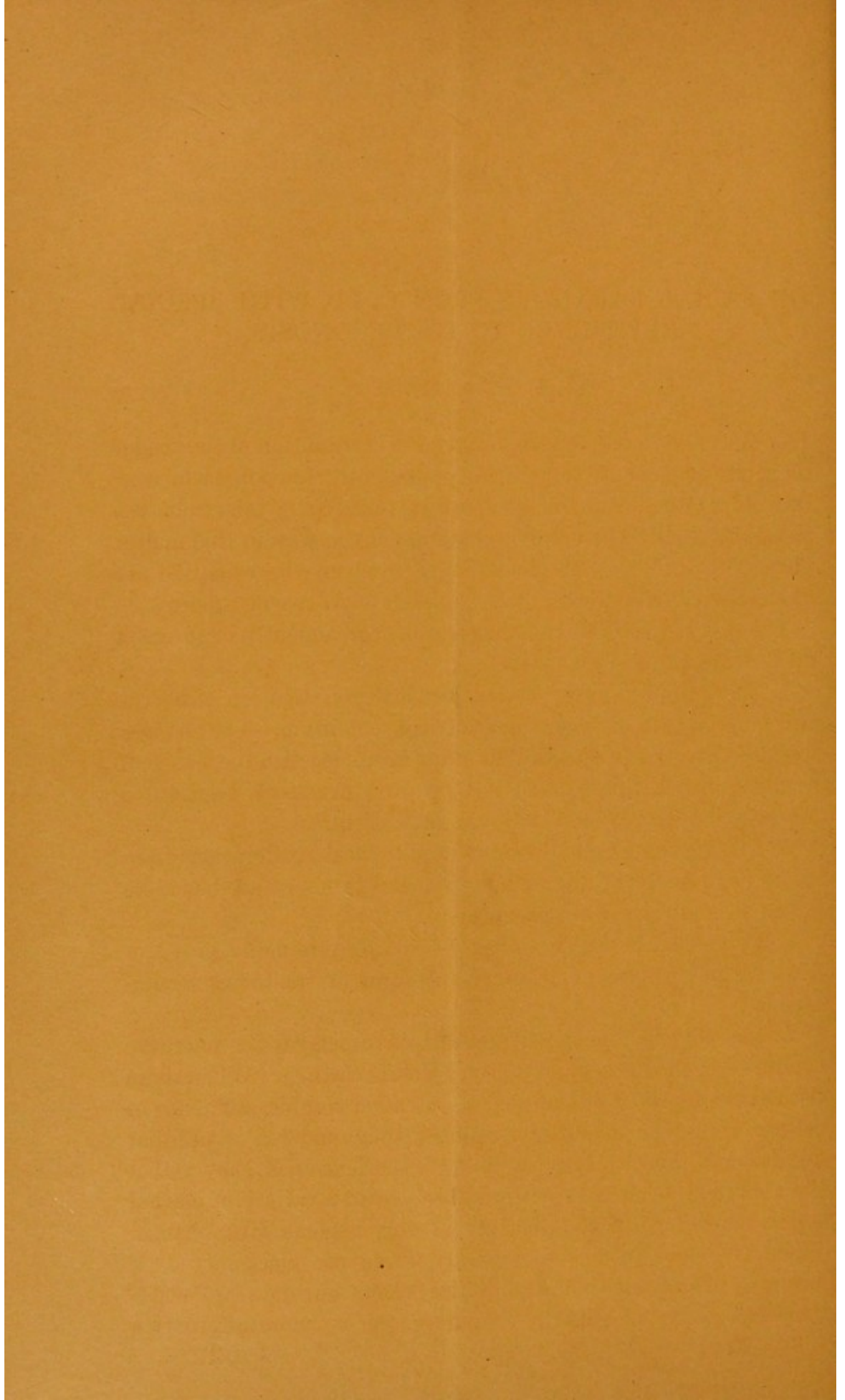
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Facial Paralysis from Cold

by

A. de Watterville







## ON FACIAL PARALYSIS FROM COLD, WITH SPECIAL REFERENCE TO ITS PROGNOSIS.

BY A. DE WATTEVILLE.

THE object of these pages is to attract the attention of the reader to some important, though not sufficiently known, facts concerning a rather common complaint—facial paralysis from exposure to cold. The credit of having led the way in this matter belongs to Prof. Erb, of Heidelberg, to whom the scientific use of electricity in medicine owes so much of its recent progress.

The gist of the following remarks may conveniently be summed up in three propositions :—

1. The primary object of the electrical investigation of nerves and muscles is to discover their nutritive condition. The changes we may discover in them often allow us to localise the cause of paralysis, when this exists; but bear no necessary relation to the degree of paralysis which may be present.

2. The results we obtain from an electrical exploration often allow us to judge of the severity of the lesion; and hence to establish a fairly certain prognosis.

3. From such a prognosis only we can rationally prove or disprove the supposed efficacy of any form of treatment recommended.

I. The only fact electricity reveals us directly is the nutritive condition of the nerves and muscles we are testing. When these tissues are deprived of the special, so-called trophic, influence of certain spinal or medullary centres, they undergo a peculiar neuritic and myositic atrophy; and experience has shown that the abnormal electrical reactions observed in a variety of morbid states depend upon the presence of this degenerative change. When, therefore, in a case of paralysis we use electricity as a means of diagnosing the seat of the lesion, our data are negative, and assist us only in excluding one or more alternative

possibilities; and even where they are positive, they do not enable us to reach a conclusion directly, but only through a process of inference in which of course any link may be erroneous and vitiate the conclusion.

Thus, in an ordinary case of wrist-drop, where we find signs of degenerative atrophy, we cannot assume either a lesion of the musculo-spiral nerve arresting the trophic influence of the cord or a lesion of the trophic centres in the cord itself without taking into consideration all the features of the case, its history and concomitant symptoms. Again, to argue from the presence of a perfect electro-contraction in a paralysed nerve to the non-implication of its trunk, and to the cerebral localisation of the lesion, is to expose oneself to grave mistakes. For instance, a patient came to me with complete right facial paralysis. He complained of having a few days before felt strange sensations on that side of the face, with pains in his head. The next morning he found, to his dismay, his face distorted to the left and immovable on the right. There was also some impairment of the sense of taste on the right side of the tongue. On applying both currents successively, I found that both nerve and muscles reacted on both sides alike. Was I then justified in attributing a cerebral origin to the paralysis without any further investigation? Far from it; apart of the fact that the upper branches of the facial were as completely paralysed as the lower ones—an unusual occurrence in paralysis of this nerve from cerebral cause—I obtained a clear history of exposure to a cold draught, and diagnosed the case as one of peripheral Bell's palsy. The electrical investigation having proved that the nutrition of the muscles was not impaired, and that the nerve had not suffered beyond losing its conductivity to voluntary impulses, my prognosis—which a short time sufficed to justify—was most favourable. Very different was another case in which a similar cause—exposure to cold air during a railway journey—resulted in paralysis of the left facial nerve. Here I found a complete abolition of response, nervous and muscular, to the strongest faradic currents. Strong galvanic shocks failed to stimulate the nerve; whilst the muscles freely responded to the galvanic stimulus; indeed, on the diseased side a much weaker current was necessary to make them contract than on the sound side. But beyond this "quantitative" alteration

in the muscular irritability, there was a corresponding "qualitative" change, which manifested itself by an abnormal response to the negative and positive pole respectively. Healthy muscles react more readily to the negative pole when the current is made, and to the positive when broken. Now, on testing the diseased muscles in this case, I obtained precisely the opposite; the positive pole excited greater contractions than the negative on closing the circuit; the negative greater than the positive on opening it. At the same time the muscular contractions had lost their vigorous, momentary, and well-defined character, and had become slower, almost vermiform, like those of unstriated fibres. From these phenomena and the other circumstances of the case I diagnosed a severe lesion of the facial nerve, leading to its degeneration, with corresponding changes in the muscles; and framed a prognosis in consequence. Six months afterwards hardly any voluntary power had returned, and further progress took place very slowly.

Between the two types of cases just described are often found transitional forms, which are characterised by a simple diminution in the irritability of the nerve tested by both currents, and an abnormal mode of muscular contraction to the galvanic stimulus. The latter does not necessarily show the complete inversion of the normal formula above mentioned. There may be simply increased irritability with a tendency of the diseased muscles to react more readily to the positive than to the negative pole on closing the circuit. The name "reaction of degenerative atrophy," or simply "degenerative reaction," has been applied to the abnormal mode of response of the affected tissues to the electric stimulus. And the form of it where the muscles only present the phenomenon has been characterised as the "partial," whilst that where there is also loss of nervous excitability is called the "complete," type of degenerative reaction. For further details, with diagrams, illustrating the development of these phenomena, and their connection with histological changes in the affected nerves and muscles, I must refer the reader whom it may interest to my *Practical Introduction to Medical Electricity*. My main task here is to show the value of electrodiagnosis in facial paralysis *a frigore* in furnishing data applicable to the prognosis of each individual case.

II. In the three categories of cases just described the loss

of power over the muscles is, from the first, absolute. There is nothing to be learnt, then, from the amount of paralysis, with reference to the depth of the nutritive lesion. On the other hand, it is obvious that the rate of recovery must in a great measure depend upon the amount of tissue change, degenerative and regenerative, involved by that lesion. Now we have seen that the modifications occurring in the electrical reactions are the direct manifestations of the nutritive changes in the diseased structures. Hence it is plain that from these modifications we shall be able to infer the duration of the histological evolution necessary for a return to health.

Experience has shown that the cases where there is no marked change in the behaviour of nerve and muscle to the electric stimuli run a short and favourable course, recovering, as a rule, in about three weeks. The cases where the nutrition of the muscles only has suffered (partial form of degenerative reaction) take a longer time—about six weeks,—whilst those which present the phenomena of the complete reaction of degeneration require three to six months to recover. These periods, of course, cannot be taken to express an absolute rule; for many circumstances, which hitherto have not been referred to any law, may influence the progress. Some “mild” cases recover in a few days, whilst others prove much more refractory; and among those of severer form some recover comparatively rapidly, whilst others take many months, or even years, to complete their evolution. It must not be forgotten, either, that some muscles may remain permanently injured, and pass from the state of paralysis into that of contracture. Yet, allowing for all contingencies, in the great majority of cases the course of the disease conforms itself to a carefully grounded prognosis, such as can only be obtained by accurate, and, if necessary, repeated electrical examination.

III. Electro-diagnosis, then, enables us to foretell in every case, with fair accuracy, the approximate duration of the disease; and to warn the patient, if needs be, of taking a too sanguine view of his prospects. But it is also of the highest use in enabling us to judge of the real value of the several plans of treatment adopted in facial paralysis. In a general way it may be said that facial paralysis from cold is a disease which tends naturally towards recovery. In a large number of cases where

a definite prognosis had been framed at the outset, a cure has resulted within the prescribed time without any treatment. It is obvious, from the nature of the lesions which characterise all but the slight form of facial paralysis, that no treatment can be expected to do more than assist the natural process of regeneration, and, possibly, keep the preliminary process of degeneration within certain limits. It is absolutely erroneous to imagine that electrification, by giving "artificial exercise" to the muscles, will prevent their degeneration. They atrophy not because they are in disuse, but because they are separated from their trophic centres, and the cycle of changes they undergo is absolutely fatal. Similar considerations apply to every form of treatment in Bell's palsy. The cases in which therapeutical procedures were apparently crowned with rapid success were cases where no deep nutritive lesion accompanied the paralysis, and which would have recovered with probably the same rapidity if left to themselves.

I should be sorry, however, to appear a complete Nihilist with reference to the use of electricity in this disease. Electricity fulfils, I believe, and alone fulfils, certain indications of which it is important not to lose sight. In all cases its use is soothing to the patient who often complains of unpleasant sensations in the paralysed region. It tends to hasten the return of the natural tonus of muscles; and this is of special importance in the case of the orbicularis palpebrarum, whose relaxed state exposes the patient to conjunctival inflammation. In the severer cases, experience, as well as every analogy, supports the view that electricity may assist nature in the process of regeneration, and in that of "re-innervation." Its use therefore is indicated not so much at the beginning of the disease as at the time when the downward or degenerative evolution has ceased, and histological reintegration has begun. The most gratifying results, however, are obtained from electrification in those cases where what I have ventured to call re-innervation is in abeyance. Here nerve and muscle have, to a great extent, recovered their normal constitution; yet the return of voluntary power over the parts is more or less incomplete. It is often surprising to find, even after years have elapsed, what electricity will do here towards the restoration of function in the paretic organs.



