due to the direct action of the substances upon the respiratory center or whether they are reflex effects due to the action of the substances upon nerve fibers. If, however, we cover the lower limbs of the frog, treated as above, with a sheet of filter paper saturated with N/10 HCl, after 3 or 4 minutes of violent struggling the frog becomes quiet and the respirations, at first inhibited, are resumed; although occasional convulsive movements occur, these become less and less frequent and respirations continue except during the actual convulsions. The rate of the respirations is, however, unaltered for the first six minutes; in ten to twelve minutes they may be accelerated 10 per cent. but not more. Now the time which elapses before the respirations are quickened is only 1 to 2 minutes when the acid is applied directly to the medulla and the animal usually does not struggle at all. Moreover, the two effects, the effect upon the respiratory center and that upon nerve fibers can readily be distinguished from one another in the case of N/10 oxalic acid. At first the normal effect of an acid upon respiration is observed, namely a marked quickening of the rhythm so that after 10 minutes the rate may be doubled. If further applications of oxalic acid be made the rate continues to increase until over one half hour after the first application of oxalic acid when the muscles of the whole animal go into prolonged tetanic contractions; the former effect is that of the acid upon the respiratory center, the latter effect is that of the oxalic acid anion upon nerve fibers.

The results are such as to indicate that the processes occurring in nerve cells during the passage of a reflex are of the nature of oxidations and that they are accelerated by acids.

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Metaplasia and metastasis of a rat tumor.

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We reported to this society on several previous occasions some facts regarding a tumor of the rat which we have propagated for more than two years. This tumor is now in its twelfth genera-

tion. The original tumor was of complex histological structure and has been regarded by us as consisting predominantly of a tissue of sarcomatous nature and to a less extent of irregular tubular formations resembling structures seen in certain endotheliomata. In the fifth generation of one series of transplantations, metastases were first noted in the regional lymphatic glands. In all previous generations the metastases were to the lungs and the kidneys; and in the other series this change in properties has not been observed. In the succeeding generations between the fifth and the eleventh, of the particular series mentioned, the lymphatic metastases have grown more common and more widely disseminated. Coincident with this change in properties of the tumor, a modification in the histological structure has been noted; the tumor has become progressively more and more adenomatous in appearance until now it has entirely cleared itself of that part which had been taken to resemble sarcoma. Hence metaplasia of the tumor in the direction of carcinoma has taken place, with which change is associated the acquisition of the property of involving the nearby and distant lymphatic glands in its growth.