vive and grow in an abnormally acid medium. This condition was also brought about by subjecting the cultures to an atmosphere composed of O_2, CO_2 and N, but this time the mixture contained a greater concentration of Co^2 than that which had been used to establish a pH of 7.8. Thus it was found that the various tissues differed not only in their rate of growth and in the amount of acid that accumulated in the medium in which they were cultivated, but also in their ability to survive and grow in a medium in which the hydrogen-ion concentration was artificially increased. In addition, they showed marked variations in the extent to which they were able to digest fibrin. The accompanying diagram (Fig. 1) shows

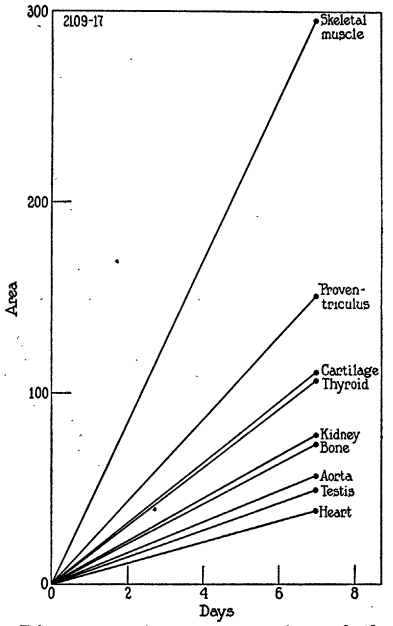

FIG. 1. Diagrammatic representation of the rate of growth of nine strains of fibroblasts isolated from a 17-year-old chick embryo and subjected to the same treatment from the beginning; 8th passage.

the relative growth rates displayed by these strains in their eighth passage. It will be seen that the fibroblasts derived from the heart muscle possessed the lowest growth energy of any of the series, whereas the fibroblasts from skeletal muscle showed the highest. In this respect, these two strains represented the extremes. Furthermore, these rapidly growing fibroblasts from skeletal muscle liberated a large amount of acid into the medium and were able to withstand a medium of high acidity. There was, however, very little digestion of fibrin. Fibroblasts from the proventriculus and the kidney, on the other hand, produced little acid, but rapidly digested the fibrin of the clot. The same was essentially true of fibroblasts derived from the thyroid, although in this case the colonies grew extremely thin, much more so than has ever been observed for other races of fibroblasts. The fibroblasts from the aorta were characterized by a large production of acid. Although their rate of multiplication was much slower than that of fibroblasts from cartilage, thyroid, kidney or the proventriculus, they produced much more acid than any of these. In spite of this, however, they grew poorly in an acid medium.

These results indicate that the common connective tissue cell, or fibroblast, does not occur throughout the organism as a separate and distinct type. Fibroblasts as a group include many different cell types. Just, for example, as the *milieu intérieur* of the thyroid is different from that of the kidney, so also are the connective tissue cells which they harbor and nourish. Hence, it seems reasonable to assume that there are as many types of fibroblasts in the body as there are tissues and organs. These various cell types were originally endowed with identical properties and potencies by virtue of a common ancestry. But as they became integral parts of developing tissues and organs, they became more and more divergent, with the final result that, when separated from the organism, they retained those qualities that they had progressively acquired as an expression of the special localized conditions under which they had lived prior to their isolation.

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