basic or surplus and turn from one stage to the other according to the use to which their products are put: such are the extraction or production of raw materials, transportation, the supply of light, heat, power, and a variety of general services. As the quantity of surplus activity expands, there is not merely a great increase in construction, in the supply of tools and machines, and so on, but also a great diversion of indifferent activities to the surplus stage.

In the third place, it is to be observed that a series of intervals in which dQ''/Q'' is constant and positive is not a series of intervals with the surplus stage undergoing uniform acceleration. For dQ''/Q'' to be constant, Q'', interval by interval, has to be increasing in a geometrical progression. Thus, if in an initial interval surplus activity is Q'' and over a subsequent series of intervals dQ''/Q'' equals $k - 1$, then the series of values for surplus activity will be Q'', kQ'', k^2Q'',... k^nQ''. Inversely, if surplus activity accelerates uniformly over a series of intervals, then dQ''/Q'' is decreasing in geometrical progression; successive values of the ratio will be rdQ''/Q'', r^2dQ''/Q'',... r^ndQ''/Q'', when the initial value of dQ''/Q'' is $1/r - 1$. Now when the surplus stage of the process is effecting a long-term acceleration of surplus activity but as yet not affecting basic activity, one may expect successive values of Q'' to increase in a geometrical progression. This gives an initial period in which the graph of dQ''/Q'' is approximately a level straight line. Next, as the surplus expansion develops and devotes more and more of its activity to the long-term acceleration of the basic stage, one may expect no more than an uniform acceleration of the surplus stage. This gives a second period in which dQ''/Q'' is curving downwards with successive values in a decreasing geometrical progression. Thirdly, as the expansion

approaches its maximum in the surplus stage, dQ" reverts to zero and Q" becomes constant. In this third period dQ"/Q" is again a level straight line but now coincident with the x-axis; H" is zero, but H'Q" may be great for a notable period to effect a long-term acceleration of the basic stage which, however, gradually declines as replacement requirements begin to mount.

The same general principles hold with regard to dQ'/Q'. When Q' accelerates in a geometrical progression, dQ'/Q' is constant. When Q' accelerates uniformly, dQ'/Q' decreases in a geometrical progression. Further, one may expect the aggregate sum of values of the increments, dQ', over a long series of intervals to be approximately in the ratio Q'/Q" to the aggregate sum of values of the increments, dQ", over the same long series of intervals. It is indeed true that Q' is very much larger than Q", since basic activity is to surplus as, say, volume to surface. But one may expect the increment of a volume to stand to the increment of a surface as the volume does to the surface. To suppose the contrary leads to absurd conclusions. If, for instance, dQ"/Q" were on a long-term aggregate much greater or much less than dQ'/Q', then a series of long-term periods would make this difference multiply in geometrical progression to effect a convergence of Q" and Q' or else a geometrically mounting divergence. Such a convergence or divergence would imply that the more roundabout methods of capitalist progress were increasingly less efficient or increasingly more efficient in expanding the supply of consumer goods. Neither view is plausible. New ideas and new methods increase existing efficiency in both the surplus and the basic stages; the ratio between the quantity of surplus and the

quantity of basic products per interval is not a matter of efficiency but of the point-to-line correspondence involved in any more roundabout method, in the fact that a single surplus product gives a flow of basic products. In a word, while any concrete realization of the capitalist idea is subject first to increasing and then to decreasing returns, the series of new capitalist ideas cannot be said to be subject to either.

There is a final observation to be made. So far attention has been directed to the latter parts of the graphs of dQ"/Q" and dQ'/Q'. It has been said that when the surplus stage devotes all its energies to self-acceleration, then Q" will be increasing in geometrical progression and dQ"/Q" will be a level straight line. When this period of gestation is coming to an end, the acceleration of Q" tends to become uniform, and then gradually to decrease to zero; when it is uniform, dQ"/Q" is decreasing in a geometrical progression, and when it is zero, dQ"/Q" is zero. Now when the acceleration of Q" is uniform, the long-term potential of the surplus stage is increasing and so the surplus stage is devoting more and more of its efforts to the long-term acceleration of the basic stage; then Q' will be increasing at an increasing rate, and the time series of its values may stand in a geometrical progression to make dQ'/Q' a level straight line. When, however, Q" becomes constant, the acceleration of Q' becomes uniform and then dQ'/Q' will curve downwards in geometrical progression; and as replacement requirements begin to mount this downward curve is accentuated until dQ' reverts to zero. Thus, both dQ"/Q" and dQ'/Q' are described as initially level straight lines that eventually curve downwards till the acceleration ratios become zero. One well may ask an account of the movement of the acceleration ratios from their initial zeros to the level straight lines.

There are two factors in such a movement: short-term acceleration and the period of generalization of a long-term acceleration. Now any long-term acceleration has to begin as a short-term acceleration. New capital equipment does not begin to accelerate rates of production until it has been produced; its production in a series of initial cases has to be a matter of the more intense or more efficient use of existing facilities, in brief, a short-term acceleration. Further, once long-term acceleration is under way, rates of production increase increasingly; their graphs are concave upwards; but the curvature moves from being flatter to rounder as the acceleration is generalized from one section to another throughout the productive process. During this period of generalization rates of production are not merely increasing in geometrical progression but moving from less to more rapid geometrical progressions.

In one very important aspect, however, the initial period of dQ'/Q' differs from the initial period of dQ"/Q". For reasons that will appear later, the basic stage will begin a short-term acceleration as soon as there is an appreciable surplus expansion. But while the short-term acceleration of the surplus stage passes automatically into a generalizing long-term acceleration, there is bound to be a lag, equal to the surplus period of gestation, before long-term acceleration can emerge in the basic stage and a further lag before it can be generalised there. Thus, the initial period of the long-term expansion will approximate to a proportionate expansion with dQ'/Q' roughly equal to dQ"/Q". But the surplus expansion would have to be quite small or the basic potential for short-term acceleration quite great, for this proportionate expansion to be maintained. Short-term acceleration can move dQ'/Q' up to a peak but

it cannot keep it at the peak; it can move it to a peak by generalizing itself throughout the basic stage; it cannot keep it at the peak, because once it is generalized, it is apt to be exhausted, and even if it is not exhausted, it cannot make the time series of values of Q' a great geometrical progression. Thus, though dQ'/Q' initially moves to a peak, it immediately begins to descent even though Q' continues to expand at an uniform time-rate of increase. It follows that the initial proportionate expansion is succeeded by a surplus expansion: dQ"/Q" is constant, because Q" is increasing in some geometrical progression; dQ'/Q' is falling from a peak, even though Q' is increasing. This situation, however, is bound to be temporary; its existence is the lag between the generalized long-term acceleration of the surplus stage and that of the basic stage. When that is overcome, dQ'/Q' moves again to a peak and remains there; and by the same token, dQ"/Q" will begin to decline. The surplus expansion is followed by a basic expansion. Finally, as replacement requirements begin to mount, the factor, H, in the product, HQ", begins to decline; the rate at which the surplus stage accelerates the basic accordingly declines; and so the basic expansion approaches its end. The ultimate situation is a static phase in which dQ' and dQ" are both zero, Q' and Q" are on new high levels but constant, and further development is awaiting new ideas, new methods, new organization.

So much for the outline of an expansive pure cycle. It assumes a long-term acceleration of the productive process and asks how such an acceleration develops. It answers by positing three periods. Generalizing short-term acceleration in both surplus and basic stages gives an initial proportionate expansion. The development of long-term accelera-

tion in the surplus stage and its lag in the basic stage gives a surplus expansion. The emergence and generalization of long-term acceleration in the basic stage, together with the impossibility of maintaining the increasing rate of acceleration in the surplus stage, gives a basic expansion. At first, dQ"/Q" is equal to dQ'/Q', then it is greater, then it is less. Without urging the necessity of such a cycle, one may say that it is solidly grounded in a dynamic structure of the productive process; and one has only to think of the practical impossibility of calculating the acceleration ratios, dQ'/Q' and dQ"/Q", to smile at the suggestion that one should try to "smooth out the pure cycle".