

ON THE CASE OF CATALYTIC LABOR*

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1. I SEE MORE than one reason why, before commenting on the bearing of Professor Melvin's interesting contribution on my own thesis, I should deal with the subsidiary issue concerning the use of "catalytic" [1, (306)]. As I have argued elsewhere [5, (44-56)], a correct analytical description of a productive process must distinguish between two categories of factors: 1) the *fund* factors, i.e., the agents which perform the mechanical work by which the "raw" materials are transformed into product(s), and 2) the *flow* factors, i.e., these very materials and, in the case of a self-reproducing process, those necessary for maintaining the efficiency of the agents intact. The representation of a static process, therefore, involves two point functions: 1) $q = F(L, K, H)$, which determines the *rate* of output, q , that the agents L , K , H (land, fixed capital, and labor power) are capable of supporting, and 2) $q = G(x, y, \dots, z)$, which determines the combinations of the input flow rates x, y, \dots, z needed for the output rate q . The fact that in actuality agents and products vary qualitatively with the method of production (labor-intensive or capital-intensive) is covered in analysis, first, by dispensing with F and writing that G depends also on L, K, H , and, second, by the heroic assumption that all the elements are physically homogeneous. In the Leontief system it is further assumed that the only relevant fund factor in any process is labor power and that capital exists only as *net* circulating capital; hence, $q = G(x, y, \dots, z; H)$.

Now, the analytical fiction that agents provide services and yet do not deteriorate, although apparently more conspicuous in the case of labor, does not do a different kind of violence to facts than other similar fictions. As a worker ends his daily service, he certainly feels tired. But no part of his labor power proper is thereby destroyed. If a man ages and ultimately dies it is not because he ordinarily performs some service. In view of these observations, I see no impropriety in applying to labor power (or to any other agent for that matter) the term "catalytic" if any amount of output can be obtained with as little labor power as we wish. In chemistry the term applies to a substance such that 1) it is needed in a small amount by a reaction, 2) it "remains *apparently* unchanged in the process," and 3) it can convert, say, "an infinite amount of hydrogen and oxygen into water."¹

2. Melvin's proof of the proposition that if in a generalized Leontief system all production functions have "continuous first and second partial derivatives everywhere," then the set of the nonnegative net products of a given labor power is compact, differs only in rigourousness from that of Samuelson [6]. Actually, from the proof I offered at the time when I enounced, independently,

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¹ *Van Nostrand Scientific Encyclopedia*, 3rd ed. (Princeton, N.J.: D. Van Nostrand Co., 1958), 287.