Hawthorne effect[1] created by Elton Mayo's study in 1924–1933 of the responses of factory workers to changing conditions.

« 4 » Carl Jung made an important contribution to our understanding of mental phenomena with his distinction between *pleroma* and *creatura*, corresponding roughly to Popper's Worlds 1 and 2 (§4), which was further developed by Gregory Bateson (1970) in his exploration of mental phenomena in self-corrective systems.

« 5 » Anthropologists working in isolation within preliterate communities have for a long time been aware of the psychological effects on themselves of such isolation, (often described as "culture shock"), in which what has been learned as "common sense" is no longer valid, and also of the inevitable effect of their presence on the community studied. Recently, the analysis of the observer's experience has become the focus of much ethnographic writing under the term "reflexivity" (Fischer & Marcus 1999), dealing with the way in which observers seek disciplined subjectivity by becoming aware of their responses and effects as participants in the systems they study, an awareness crystallized in the description of ethnographic method as "participant observation."

« 6 » Umpleby's reference to climate change (§33) might well be supplemented by a discussion of how "denial" – the desire *not* to know – can distort observation and rational decision making, often for the economic or political advantage of the decision maker.

« 7 » Second-order cybernetics has an immensely important potential role to play for all the social sciences in reinforcing awareness that observation is itself a form of participation. This awareness is advanced through the emphasis on circular (as opposed to linear) causation and the importance of feedback. Umpleby offers a number of useful approaches in training researchers to this awareness, which has implications not only for philosophy of science but also for all fields dealing with causation in living systems, especially ethics, which one might hope would be relevant in management, economics, and political science. In living systems, including human societies and ecosystems, simple linear causation may be the exception rather than the rule, because such systems are responsive to differences, which leads to a need for a more complex theory of causality and systematic attention to circular loops and side effects such as environmental pollution and disruption (Bateson 2004).[2]

1| Also known as the "observer effect," it describes the fact that individuals change their behavior when they become aware of being observed (Landsberger 1958).

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Second-Order Observation in Social Science: Autopoietic Foundations

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> Upshot • Second-order science requires a specific methodology. It thereby reverses the classical observer-observed relation in favor of the observed – i.e., the first-order observers – if the principle of autopoiesis is acknowledged.

« 1 » Karl Popper wanted to "exorcise the ghost called […] 'the observer'" (Popper 1967: 7). This was not to deny the importance of the observer but to clarify its role. An observer tests theories since each observation is guided by a theory as a self-made instrument of thought (Popper 1989: 157). With this clarification, Popper justifies second-order thinking. That is, the inclusion of the observer in what is observed. Another observer could choose another theory and observe something different in the same situation (without being wrong). The observer is "inside the box," as Gregory Bateson and Margaret Mead formulate it (Brand, Bateson & Mead 1976: 38 or "a person who considers oneself to be a participant actor," in the words of Heinz von Foerster (2003: 289).

« 2 » Since the inclusion of the observer changes the scope of the object of investigation, Stuart Umpleby is quite right to emphasize the importance of particular second-order theories and methods. He sketches a program for second-order science by addressing specifically the social sciences. As a sociologist, I am very much in favor of such an undertaking because "participant observation" is a basic methodology in sociology, with early use in empirical investigations such as "Mariental" or "Street Corner Society," which became sociological classics.

« 3 » There exist a broad variety of methodological considerations addressing participant observation. Umpleby lists some of them, and others could be added such as grounded theory or stakeholder theory (Glaser & Strauss 1967; Freeman et al. 2010). Niklas Luhmann's theory of social systems could also be instrumental for the further elaboration of second-order science, since it already took up basic ideas of second-order observation (Luhmann 1989, 1993). Both the observed system and the observing system are here conceptualized as autopoietic entities constituting themselves and constructing the reality of their world through self-referential operations. Thereby, the observed system's mode of attribution – i.e., the observed actor is the first-order observer – is distinguished from the observer's mode of attribution – i.e., the second-order observer. In the following, the examples of "Mariental" and "Street Corner Society" are first used to illustrate aspects of second-order science and then to show how the notion of autopoietic systems can be applied.

2| See also my dinner speech "Living in cybernetics – making it personal" at the 2014 Annual Meeting of the American Society for Cybernetics, http://asc-cybernetics.org/2014/?page_id=121

Participant observation in the examples "Mariental" and "Street Corner Society"

« 4 » "Marienthal. The Sociography of an Unemployed Community" (Jahoda, Lazarsfeld & Zeisl 2002) studied the impact of long-lasting total unemployment in a community in Austria from 1931 to 1932. It became a classic because of its methodological approach. This approach linked nonreactive techniques such as statistical evaluation, analysis of documents, and methods of observation with reactive techniques such as participant observation, action research, surveys, and tests. Researchers did not see themselves as detached and uninvolved or as mere reporters or outside observers. Instead, they tried to adapt to the community's life by participating in activities useful to the community. They offered courses on how to make new clothing for the children out of the discarded clothes of the adults, conducted gymnastic courses to establish contact with the youth, organized free doctors' advice on all sorts of medical problems once a week and established contacts with political and semi-political organizations in the industrial village (1486 inhabitants). Especially welcomed was their organization of a collection in Vienna of clothes that were, after cleaning and repairing, distributed in the village, together with new shoes and socks that they bought for the children with their own funds. All these different activities allowed deep insights in the needs, struggles and survival strategies of those investigated.

« 5 » "Street Corner Society: The Social Structure of an Italian Slum" (Whyte 1993) is a community study that changed the way poverty was understood. The field work took place in Boston from 1937 to 1938, with the author living with an Italian-American family that operated a restaurant. Key to his access to the community was a young man called "Doc," who agreed to support the research and established access to the Norton Street gang and the Italian Community Club. Whyte describes how he started the field work as a nonparticipating observer. As he became accepted into the community, he found himself becoming almost a non-observing participant since he enjoyed the life in the community very much. It was the pressure of writing reports to receive his grants that reminded him to pursue his studies. He used diagrams to represent and analyze the communicative interactions between various types of participants, including the observer himself (Figure 1). Before finalizing the study, Whyte discussed the manuscript with Doc, which resulted in long conversations on his suggestions and criticism, and beyond that received further feedback from other group members.

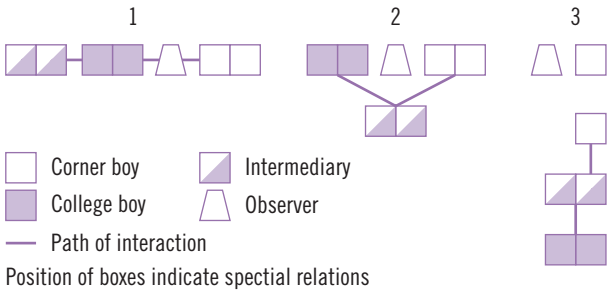

Figure 1 • Development of a street corner conversion in three steps (informal meeting in the evening on the street) (Adapted from Whyte 1993: 95).

Participant observation in terms of autopoiesis

« 6 » In both studies – "Marienthal" and "Street Corner Society" – the researchers were quite creative at coping with the "problem" of autopoiesis, i.e., of including "itself in the fields of its objects" (Luhmann 1990: 15f). Initially, an autopoietic (that is, self-reproducing) system is unobservable because the observer's self-referential operations are different from the self-referential operations of the observed systems (i.e., the actors' self-referential operations). Consequently, the actors' behaviors are contingent for the observer. This problem can be solved by the second-order observing system (the observer) via focusing on those self-determined and self-determining distinctions that the first-order observing systems (the actors) use to frame their own observations. Thereby the observer develops (or tests) a theory as an instrument of thought (in the meaning of Popper) as second-order distinctions. The main challenge in the "Marienthal" and the "Street Corner" study was therefore to learn what the self-determined and self-determining distinctions of the first-order observing systems (the actors) could be and how this would relate to (new or altered) second-order distinctions. This was neither possible from a distance nor could it be done in one or two short interactions. Instead, the observers became located "inside the box" (Bateson & Mead) as persons who acted over a longer period of time as "participants" (Foerster), and were on this basis able to cope with the unavoidable contingency resulting from their own and the observed actors' autopoiesis (Luhmann). Umpleby's starting points for logical arguments of second-order science perfectly reflect this thinking (§32). In particular, I appreciate his notions that:

a | knowledge has to be organized as methods (in addition to theories) since methods describe the actions of observers/participants; and

b | the dimension of time has to be added to resolve problems involving self-reference.

« 7 » In summary, it can be said that the idea of second-order observation reverses the classical observer-observed relation. Whereas the definition power is with the observer in the classical observer-observed relation, it is with the observed in the framework of an autopoiesis-acknowledging second-order observation.

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