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other side of Cloudy Pass did pollute streams and destroy fish. Even now, years after the operation was abandoned, a vast mound of inert, lifeless, brown dirt, loaded with sulfuric acid, fills half the valley of Railroad Creek, waiting for the spring floods from rain and melting snow to carry more of it down to Lake Chelan.

It may be "obvious that the excavation from which both ore and waste are derived could ultimately contain the tailings"; nevertheless, the concentration plant will be 1500 feet below the pit and it is unlikely that Kennecott will hoist the tailings back to their original level as a public service. They are likely to remain precariously perched on a steep mountainside where the spring runoff will have a much greater erosive effect than in the relatively level valley of Railroad Creek.

There are many other undeveloped ore deposits in the United States. One in the Twin Buttes area of Arizona between Tucson and Nogales is being prepared for mining by Anaconda Copper and they are currently running full-page advertisements (see the inside back cover of *Saturday Review*, 28 Oct.) to show how their strip operation is being camouflaged by plantings of indigenous shrubbery. In a flat cactus desert of Arizona this is hardly necessary; the pit is not an offensive contrast to the dry, bare landscape. I would like to invite Kennecott to publish a similar color photograph of Miner's Ridge and show by photomontage what their pit would look like.

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Liberties with Language

Richards' analysis (Letters, 20 Oct.) has enabled me to identify, retrospectively, an oddity I encountered some years ago in a manuscript. The text announced that, to allow for some variable or other, values in a table had been "adjusted." This clearly represents the third term in the series: "to adjust; to make an adjustment; to adjustment." One hopes that no additional terms will make an appearance to be classificationed.

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Masquerade of Undirected Research

For almost a year Project Hindsight has been under discussion (18 Nov. 1966, p. 872; 2 Dec. 1966, p. 1123; 23 June, p. 1571; 29 Sept., p. 1512), and in all that time a point of fundamental importance has been ignored. "Undirected" research is *not* equivalent to pure or basic research.

Basic scientific research is concerned with new ideas, new concepts, new principles. It is not concerned with practical applications or development of things, but with the development of ideas fundamental to nature. For this reason it requires a very special scientific competence, even genius, as well as a highly developed sense of purpose and direction.

The hard fact is that the overwhelming majority of scientists are not capable of performing basic research to any significant extent, just as there are many well-trained musical arrangers but there are very few really good composers.

Unfortunately, few scientists are willing to admit to an incapability of accomplishing basic and fundamental research, particularly if they are in academic life. Hence there has arisen that form of self-deception in which the scientist reasons that if his work is "undirected"—not directed toward a specific goal—then it must be basic research. This may be one of the greatest *non sequiturs* of all time, but that does not prevent one afflicted with the delusion from fighting with astounding ferocity for funds for "undirected research." In a sense he is fighting to maintain status, face, and self-respect.

The main conclusion of Project Hindsight (and I support it) is that the usual scientist is more productive when he is given specific goals. To equate this to an attack on the value of basic research is ridiculous. The conclusion may be unpalatable to some, but still the evidence is there that a great deal of undirected research is mere timeserving and scientific busywork masquerading as basic research. The large body of scientists supported by public and corporate funds and allegedly engaged in basic research had best recognize this unhealthy situation and come to grips with it, rather than denounce those who have uncovered it.

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