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Remaking Natural Knowledge: Recycling and the History of Science and Technology

A common conception in the history of science is that, beginning with the “Scientific Revolution” of the sixteenth to seventeenth centuries, scientists (or “natural philosophers” as they were then known) rejected a medieval reverence for the old in favor of a concern to produce new instruments, new experiments and new knowledge. Innovation should replace the repetition or rehearsal of ancient ideas. This project sets out to offer a significant revision to such a picture by exploring practices of recycling in science between the seventeenth and nineteenth centuries. I propose that the sciences continued to rely fundamentally on the old in widespread practices of re-use and repair that marked science in the age of the Scientific Revolution and beyond. Natural philosophers routinely cared for, repaired and re-used instruments and equipment, passed on secondhand specimens and books at auctions and in wills, or worked hard to make science useful to industries employing waste materials, such as rags, paper, metals, and bones. All of these efforts had a significant impact on the direction of scientific research and the theories and practices that shaped modern science. I use the term “recycling” to refer to historical practices intended to prolong the life of materials, either through the careful stewardship and repair of objects, or through the adaptation or conversion of broken, damaged, or waste materials to novel uses. I do not assume a relationship between these historical practices and current environmental recycling, although I am certainly interested in considering their significance for recycling in the present.

This project will set the history of recycling practices in science within a broader historical context, examining the ways in which techniques of re-use and repair have circulated between scientific and other sites, as follows:

1. *The Household and Laboratory.* Much early modern science took place in existing spaces such as kitchens and cellars, churches, university buildings, coffee houses, and workshops. How did the practices associated with thrift and the care of materials in such settings shape early scientific labors, e.g.; the use of kitchenware in chemistry; the re-use of lenses and brass in astronomical instruments; techniques for cementing broken glass, porcelain; and the emergence of the “string and sealing wax” approach to science?

2. *The Factory.* How did the sciences shape emerging industries devoted to the re-use of waste materials in the eighteenth and nineteenth centuries? This section considers the contributions of chemists, engineers, and physicists to the utilization of various organic and chemical waste products in new manufacturing processes in the Industrial Revolution. It also asks how factory techniques fed back into science, shaping novel laboratory practices, new theories such as thermodynamics, and theological views of waste in nature.

3. *The Street.* This section traces the nineteenth-century interactions of scientists with a broad underclass of “scavengers,” professionals who scoured the streets for waste to be

resold or re-used. In the late nineteenth century, scientists, including Lord Kelvin, sought to rationalize and mechanize urban waste collection and disposal, introducing new techniques such as incineration and landfill. The subsequent decline in urban recycling will be assessed in relation to a similar decline in scientific recycling, e.g. in the end of the “string and sealing wax” approach to experimentation and the emergence of “big science.”

In addition to examining these local economies of techniques, the project will also seek to compare different international contexts for science and recycling.