

Articles

Industrial Arts/Technology Education as a Social Study: The Original Intent?

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It is not difficult to provide considerable support for the contention that as a general-education subject, industrial arts had its start at Teachers College, Columbia University (Feirer & Lindbeck, 1961; Towers, Lux & Ray, 1966; McPherson, 1978). The term *industrial arts* (as a replacement for *manual arts*) was proposed by Teachers College professor Richards (Bawden, 1950; Smith, 1981); the “first...and only” definition of the subject was written by faculty members Bonser and Mossman (Brown, 1977, p. 2) in their book *Industrial Arts for Elementary Schools*; and the social-industrial theory of industrial arts was developed at Teachers College by Bonser and College Dean Russell (Snedden & Warner, 1927).

Within a quarter-century of the publication of *Industrial Arts for Elementary Schools*, Bonser and Mossman became an important part of the history of general-education industrial arts. Winslow (1922), Vaughn and Mays (1924), Newkirk (1940), and Wilber (1948) acknowledged or referred to Bonser and Mossman’s work in describing the subject of their industrial arts texts. Within four years of his death, Bonser’s early life and work had already been chronicled in a major work by Phipps (1935). Bawden (1950) characterized Bonser and Mossman’s ideas as “receiving a great deal of attention and popular support . . . it was a formula for a new concept of industrial arts” (p. 40).

It is clear that Bonser and Mossman (1923) intended industrial arts to be general education for boys and girls of all ages and grade levels. Industrial arts, they wrote, “is not a special subject . . . but, quite the contrary, it is rather the most general of all in its far-reaching relationships” (p. 74). It is also certain that modern technology education can be traced directly back to this philosophy and to Bonser and Mossman (Householder, 1989; Volk, 1993; Lewis, 1994). Finally, it is clear that their work built directly upon the

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“Social-Industrial Theory” of Bonser and Russell, and Dewey’s psychology of occupations (see McPherson, 1972, Chapter V); and consequently that it was an expression of the philosophy of Teachers College in the 1920s. It should also be noted that modern technology education has been shown to be a linear extension of this original philosophy of industrial arts (Foster, 1994b).

What was the nature of that philosophy? Wygant (1959) performed an in-depth study of the Fine and Industrial Arts department of Teachers College. He determined that, under Dean Russell and Director Bonser, “industrial arts became an adjunct to what we now know as social studies” (p. 221). Wygant did not, however, offer evidence to support this conclusion.

Wygant’s Assertion

This paper will be a defense of Wygant’s contention. The profession of technology education is at present emphasizing the technical aspects of industry, not social considerations. Emphases such as math/science/technology, the “modular approach,” engineering technology, and “tech prep” are currently in favor (Petrina, 1994; Foster, 1994a). If Wygant’s interpretation reflects the intentions of Russell, Bonser, and Mossman, the field of technology education has surely drifted from its original course. Pertinent works will be considered here in an attempt to demonstrate the validity of Wygant’s contention.

Specifically, this paper will demonstrate that industrial arts was originally intended to be part of the “social studies.”

The “Industrial-Social Theory”

“The social aspects of industrial arts as a school subject, under the leadership of James Earle Russell and Frederick Gordon Bonser, came to mean a more vital and inclusive study of reality than the manual training movement meant” (Mossman, 1938, p. 173).

Perhaps one of the best-known and most straightforward descriptions of the social conception of industrial arts is the Teachers College publication *Industrial Education* (Russell & Bonser, 1914). It was comprised of “The School and Industrial Life,” written by Russell, and “Fundamental Values in Industrial Education,” by Bonser.¹ Snedden and Warner (1928), respectively Professor and doctoral student at Teachers College, termed the philosophy espoused therein “The Russell-Bonser Plan” and “The Industrial Social Theory—” interchangeable terms that would appear repeatedly in later literature (McPherson, 1972).²

¹cf. Russell, 1909, n.d.; and Bonser, 1910, respectively.

²In biographing Bonser, McPherson shed considerable doubt on the suggestion made by some industrial arts historians that both Russell’s and Bonser’s contributions to *Industrial Education* originated with Russell alone. While assigning authorship to this document certainly has historical importance, it will be assumed here that both Russell and Bonser contributed to the development of the industrial-social theory.

Russell began his paper with an overview of the school curriculum and its problems. He identified two prevailing classifications of school subjects: humanistic, including language, art, and the like; and scientific, including mathematics, geography, and what would today be considered the natural sciences (Russell & Bonser, 1914). He judged the curriculum of the day to be “culpably bookish” (p. 2), albeit including a few additional subjects, such as gymnastics and the practical arts (including manual training), the latter mistaken for “fads and frills” (p. 4). But he was not an advocate of state-of-the-art manual training which, he regarded “in fact . . . little more than applied design” (p. 4).

As a replacement he suggested “economic studies . . . to provide instruction in the industries:”

Of course I do not mean economic studies in the elementary school for the sake of technical training in any industry . . . I mean the study of industries for the sake of a better perspective on man’s achievements in controlling the production, distribution, and consumption of the things which constitute his material wealth” (p. 6).

Russell went on to advocate a “threefold division of the curriculum” that was to include not only the humanistic and scientific studies, but the “industrial” as well (p. 7). He concluded “that industrial education is essential to the social and political well-being of a democracy” (p. 19). Immediately following Russell’s treatise in the publication was Bonser’s “Fundamental Values in Industrial Education.” Bonser’s plan was “very similar” to Russell’s (Stombaugh, 1936, p. 129).

Like Russell, Bonser began his paper with criticisms of both the educational system and the industrial education of the day. “When the American people become fully conscious of an idea for reform, the idea expresses itself in practical application with astonishing rapidity,” he began. “. . . the present day conduct of industrial education may be an illustration of this tendency” (Russell & Bonser, 1914, p. 23). In place of the system of the time Bonser suggested that

a subject of study can be developed largely taking the place of the four subjects, drawing, manual training, domestic science, and domestic art, which will include the really most vital and fundamental values in all of these. It is also offered that this subject will . . . [develop] a knowl

edge and understanding of social and economic relationships essential to every child (p. 29).

Bonser devoted the next several pages to practical examples of units which demonstrated the integration of the four subjects.

Throughout his paper Bonser advocated a social treatment of, and provided a social rationale for, industrial studies in general education. "Industrial Arts, as a school subject, is the distilled experience of man in his resolution of natural materials for his needs" (p. 50).

The social-industrial theory of Russell and Bonser was described Anderson (1926) as "cultural industrial education" (p. 221). Anderson, Fisher (1967), and many other historians of industrial education defined the Russell-Bonser plan by contrasting it with the theretofore prevailing asocial manual and industrial studies—as, for example, a "reaction against the tendency to exalt the importance of hand training *per se*" (Anderson, 1926, p. 221)—"a most serious indictment against 'manual training'" (Stombaugh, 1936, p. 128).

Lest the ingenuity of the plan be exaggerated, it should be pointed out that as Toepfer (1966) indicated, parts of Russell's contributions to the industrial-social theory were based on Dewey's 1900 book *The School and Society*; Fisher (1967) made similar suggestions regarding Bonser's contributions. Nonetheless, the Russell-Bonser plan was a significant departure from the industrial education of the day.

Their proposal received widespread notice and favorable attention (Smith, 1981; Miller, 1979), but industrial education was slow to react (Bawden, 1950; Smith, 1981). Nonetheless the field has recognized the industrial-social theory as a defining event in its history. "It did much to revolutionize the industrial arts" (Stombaugh, 1936, p. 129).

Olson (1963) called it "epoch-making," (p. 9); most other recent histories regarded it as one of the most significant publications in the field. The implementation of the plan at a Teachers College laboratory school in 1910 notwithstanding, and despite the significant lip service the industrial-social theory has received in the literature of industrial arts and technology education, there is no indication that it has been practiced to any large degree, or for any significant period of time.

Bonser and Mossman's Industrial Arts for Elementary Schools

In 1923 Bonser and Mossman published a book which further described the social-industrial theory. As such, *Industrial Arts for Elementary Schools* was quite influential. "This book has served well as the basis of our present day philosophy for correlation of industrial arts activity with subject matter content" (ACESIA, 1971, p. 50). Scobey referred to it as "probably the most

influential basis for the present emerging concept of industrial arts” (1968, p. 5); to Olson, it was “nothing short of amazing” (1963, p. 8). “This position established guidelines for 65 years of curriculum development in Technology Education” (Householder, 1989, p. 11).

As will be discussed later, *Industrial Arts for Elementary Schools* has been considered by some to be vague in some practical aspects; yet its theoretical basis was very clear. Bonser and Mossman (1923) defined *industrial arts* as:

... a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes (p. 5).

More importantly, they reasoned, these physical changes beget social change:

By considering the changes in the well-being of man resulting from each invention, it will become increasingly apparent how fully man’s progress in civilization and wealth has been parallel with his development of new tools and machines (p. 453).

Their social study of industry had a related methodology—children would actually engage in changing the forms of materials in order to learn not only about the processes of manufacture, but, more importantly, to gain a perspective on history, an appreciation of cultures, and an ability to cooperate with others. Construction in the classroom was viewed as “a means to a higher end—” an “approach to higher forms of industrial studies” (p. 17). “Gradually through [industrial arts in the middle and upper elementary grades] those values are brought out which are important in relationship to health, economy, taste in living, and which should be instrumental in making for greater efficiency in social cooperation” (p. 84).

Bonser and Mossman’s basis for industrial arts as a study of culture and society was a prominent part of their book, and since its publication, curriculum developers and historians have recognized Bonser and Mossman’s intentions. “As *content*, industrial arts was conceived as helping children to develop an appreciation and understanding of industry in the culture—a study of the related and resultant social problems” (Miller, 1979, p. 50). Unfortunately, action did not follow that recognition.

Mossman’s Philosophy of Industrial Arts

Lois Coffey Mossman (1877-1944) is known in the technology education profession almost exclusively for her work with Bonser in their aforementioned *Industrial Arts for Elementary Schools* (1923). It is quite common, however, for that book and its major ideas to be attributed to Bonser alone;

Bawden (1950), Sredl (1964), Smith (1981), and Foster (1993) hardly constitute a majority of those who have incorrectly attributed the book's definition of *industrial arts* solely to Bonser. When Mossman is mentioned at all in the history of industrial arts, it is only very rarely without Bonser.

Her other writings demonstrate that in the early 1920s she viewed, as Bonser did, industrial arts as a separate area of study which should be integrated with the total school program, including history and geography. But by late in that decade, Mossman clearly espoused the views that industrial arts was inseparable from the other social studies, and that industrial arts was a *methodology* necessary to the study of society.

At the outset of the 1920s, Mossman jointly defined the terms *industrial arts* and *household arts* in a manner similar to her aforementioned 1923 definition with Bonser for the former. "By the terms industrial and household arts we mean considerations of changes made in the forms of materials to increase their value for human use" (1921, p. 322). "The social studies," she wrote toward the end of the decade:

... have to do, then, with those considerations affecting human living which are involved in...contact with the work of the world and its laws in (a) procuring and producing raw materials, (b) manufacturing these raw materials into more useful commodities, and (c) distributing these materials and commodities to the people who consume them (1929b, p. 322).

Mossman (1929b) specified that this aspect of the social studies related directly to foods, clothing, shelter, records, containers to hold one's possessions, and tools and machines (p. 328). Her interpretation of *industrial arts* was nearly identical: it was to be a study of food, clothing, shelter, records of human experience, containers to hold possessions, and tools and machines (Mossman, 1927, p. 287).

Her book *Principles of Teaching and Learning in the Elementary School* (Mossman, 1929a) was in large part a consideration the subjects of the elementary school curriculum. Therein the term "industrial arts" was listed in neither the table of contents nor the index. What most would consider "industrial arts" was wholly included in the social studies. As part of this subject, she wrote, "we should have ... manufacturing; a little of this is inadequately included in industrial arts or manual training, and in the household arts" (1929a, p. 143). She again specified the needs of people to furnish themselves with food, clothing, shelter, and the like in describing the content of the social studies.

It bears repetition that in her major book concerning the elementary school curriculum, Mossman considered industrial arts an integrated part of the social studies curriculum.

Throughout her career, Mossman specified that social industrial arts subject matter was best learned through constructive activities: “genuine participation in the processes of making the products may develop respect for work and for man’s inventive achievement” (1938, p. 60). Her rationale for the inclusions of social studies and industrial arts in the elementary curriculum were highly interdependent:

Children are interested in questions about how people live and what people do. . . . Genuine social appreciation is furthered if one understands the simple hand process and the steps in the evolution to the complex machinery processes. . . . Therefore, the simple weaving of a rug for the doll house in the first grade does more than contribute to natural tendencies of children at that age. It provides a bit of detailed experience in a process—a detail that is fundamental in appreciating the weaving industry of the world of all time. When the child comes in contact with woven products and when he has become old enough to consider the changes brought about in society by the development of machinery, the bit of weaving experience may contribute toward the meanings involved (1929b, p. 329-330).

If social studies objectives were furthered, in Mossman’s views, by industrial arts methodology, so was industrial arts content inseparable from the cultural studies (1927, p. 289).

As one of the founders of the general-education industrial arts in the United States, Mossman clearly held the view that industrial arts was a part of the social studies.

Bonser’s Philosophy of Industrial Arts

Although industrial arts was only one of many educational concerns of Frederick Gordon Bonser (1875-1931), he has been identified as one of the most prominent molders of modern *technology education* philosophy (Kirkwood, Foster & Bartow, 1994). As previously indicated, Bonser was involved in the conception and writing of perhaps the two most important documents in the elucidation of the general-education interpretation of industrial arts.

Bonser viewed the industrial arts as part of the “practical arts” below the sixth grade. He emphasized “the elements of social purpose and human value” in studies of the industrial arts (1920b, p. 243). The related study of home economics, in this interpretation, was a social subject as well (Bonser, 1929). In 1922 he provided this definition and explanation of *industrial arts*:

Definition—industrial arts is a study of

1. The changes made by man in natural materials to increase their value in meeting needs for material supplies—food, clothing, shelter, etc.

2. The effects upon individual and social life by the means used to make these changes.

. . . I would emphasize the second part of the definition is worthy of much more attention than is given to it (Bonser, 1922, p. 121).

Like Mossman, Bonser favored an active, progressive, project-oriented classroom. Although he specifically advised against making industrial arts the core of the elementary curriculum (Bonser, 1927a), he emphasized exactly the same qualities in classroom projects as he did in objectives for industrial arts. As Mossman (1931) put it, “he believed that . . . the study of industry is truly cultural” (p. 4).

The projects selected should in themselves be cooperative, socialized life situations in which the individual contributions will derive their worth from the measure in which they promote the common interests of the group (Bonser, 1920a, p. 116).

The study of industrial arts is a factor in educating for citizenship in just the degree that it yields an understanding of meanings and an appreciation of values significant for the direction of conduct in individual and social life” (Bonser, 1922, p. 125).

In light of an article he wrote in 1927 for the journal *School and Society*, it is hardly necessary to repeat the perhaps hundreds of passages which would demonstrate Bonser’s social conception of industrial arts. In that article, Bonser plainly stated his opinion:

The social studies *Trivium*—history, geography, and civics—should expand itself into a *Quadrivium* by adding industrial arts as a representative of the basic social activities, more vital to immediate social participation than many of the questions of the other three fields or of any fusion of them into one (Bonser, 1927b, p. 679).

The Contributions of Others at Teachers College

Bonser, Mossman, and Russell probably did more than any three individuals of the time to advance the social theory of the industrial arts. But a cursory overview of related works demonstrates plainly that their work was augmented and extended by many other educators.

Although their contributions to the field have been largely ignored, more than a few women associated with industrial arts and elementary education at Teachers College and its laboratory schools at the time produced scholarly

works on industrial arts. Clara Stilmar's (1912) fifth-grade industrial-arts plan for the College's Speyer laboratory school was one of many published under Bonser's direction of the school. In addition, books by Alice Krackowizer (1919) and Margaret Wells (1921) discussed in detail the need for industrial arts activities to have a social perspective.

A few years earlier, Sara Patrick completed her master's degree at Teachers college. Her master's essay (Patrick, 1916) was written on the topic of the "problem" method in industrial arts and its relation to efforts by individuals and societies to furnish themselves with records of their accomplishments. Patrick was a full-time instructor of industrial arts education for 25 years at Teachers College, in all teaching many more elementary industrial arts courses than Bonser and Mossman combined. In fact, while Bonser and Mossman taught courses in various areas, including curriculum design and elementary education, "the courses to prepare teachers for this type of work [industrial arts as a social study] at the elementary level were continued at Teachers College by Sara Patrick" (Wygant, 1959, p. 222). Her interpretation of the purpose of industrial arts was as part of the "social studies" (Welling & Calkins, 1923, p. viii), and her Industrial Arts Cooperative, which she founded in 1924, provided thousands of teachers with industrial and fine arts ideas over several decades. It was the first teacher's cooperative in the United States.³

Theresa C. Gunther (1931) performed her well-known doctoral research under Bonser and Mossman. In that study, which compared manipulative and nonmanipulative industrial arts, she wrote that "in initiating this experiment, it is assumed that the elementary industrial arts involve a body of subject matter of value and of interest to the children. Their questions and chance remarks give evidence that they are interested in *man and man's work*" (p. 3; emphasis added).

Perhaps the most extensive such work was the 1923 book *Social and Industrial Studies for the Elementary Grades* by Jane Welling and Charlotte Calkins. It contained more than 300 pages explicating the teaching of the industrial arts—food, clothing, shelter, implements, and records—organized in three classifications: social life and the family, modern and historic background, and problems of modern life. Welling and Calkins (1923) acknowledged their "indebtedness" to Bonser and Patrick, "who are the inspiration of their study and investigation of 'industrial arts' and related 'social studies'" (p. viii). Throughout the book, the authors referred to the topic as "the social and industrial studies."

³From information on file at the Special Collections Department, Milbank Memorial Library, Teachers College, Columbia University, New York.

Why the Intentions Were Never Realized

As mentioned previously, the Bonser-Mossman-Russell social-industrial approach to industrial arts was never implemented on a large scale. But whether the subject could have been widely practiced is wholly unrelated to the fact that the original conception for industrial arts was as a social study. The failure of industrial arts historians to recognize works such as that of Welling and Calkins, Patrick, and other women with point-of-practice concerns for the elementary school has done more than simply obscure the role of women in the development of industrial arts. It has relegated the comparatively theoretical work of Bonser, Mossman, and Russell, upon which they were based, to the mounting collection of ivory-tower philosophies—laudable, but entirely impractical.

In explaining why the social philosophy was never implemented, Towers, Lux and Ray (1966) noted that “Bonser spelled out the major subdivisions of content, such as the activities to provide food, clothing, and shelter, but he did not develop a complete subject matter structure” (p. 106). But others, such as Welling and Calkins (1923), Wells (1921) and Krackowizer (1919) fleshed out Bonser and Mossman’s theories. By focusing only on Bonser, historians have been able to rationalize the profession’s lack of attention to the social-industrial conception thusly: forced to choose between Bonser’s weak and incomplete content structure and the established, proven, and well-regarded practices in manual education, the profession’s only chance for survival was to ignore some or all of Bonser’s theories. Towers, Lux, and Ray went on to credit Warner with continuing the Bonser and Mossman tradition (p. 107), but Petrina and Volk (in press) provided a different view which deserves attention. They suggested that the profession generally, and Warner specifically, had the opportunity to implement a more progressive, cultural industrial arts. Warner clearly regarded the Bonser-Mossman-Russell interpretation as his prime influence (e.g. Warner, 1928), but he “disregarded much of their vision” (Petrina & Volk, in press)—including the social-industrial conception.

Hoots (1974) cited an “out-of-context application of the Bonser philosophy” (p. 234) as the root of the problem, adding that “the manner of presentation utilized by Bonser was somewhat difficult to follow and somewhat difficult to implement” (1974, p. 227). Bawden (1950) pointed to the “problem of organization” as to why “it was inevitable that Dr. Bonser’s proposals should meet a varied reception” (p. 44). Again, the question may be raised as to whether Bonser alone could have been expected to develop a broad vision *and* a plan for implementation. Olson (1963) noted that “inconsistencies” between traditional ideas and Bonser’s interpretation “became increasingly annoying to teachers and leaders in these fields” (p. 9-10).

To be fair, it should be mentioned that Bonser himself may have been regarded by his colleagues as “somewhat difficult to follow.” Well-known educator William Kilpatrick frequently wrote in his diaries of Bonser, often complimenting his ideas, but criticizing their organization or presentation. For example, in 1912 Kilpatrick went “to hear a discussion on Bonser’s ‘Industrial Arts.’ He was good, but in my opinion there is yet need of study to clarify the ideas involved” (1912, p. 78).

To some degree, the ideas involved *were* clarified—but not by Bonser alone. The burden placed on Bonser to do so is unreasonable per se; it is more unreasonable in light of the facts that he did not develop either of his two major works on industrial arts alone; that he died at the height of his career; and that he had many educational concerns other than industrial arts.

This last point deserves more detailed attention. In the history of industrial arts/technology education it has been repeatedly noted that Bonser had no background in shopwork or drafting, had never worked in industry, had not been trained as a teacher of industrial subjects, and had never taught those subjects to schoolchildren (e.g. Mossman, 1931).

Two letters from Maurice Bigelow, Teachers College Director of Practical Arts, to Dean Russell illustrate that as early as seven years before the publication of *Industrial Arts for Elementary Schools*, the breadth of Bonser’s interests was causing considerable trouble in assigning him to a school within the college. Bigelow argued that “we very much need Professor Bonser [in industrial arts] . . . even if some of his attention is in the future to be centered on Elementary Education” (Bigelow, 1916, p. 1). This request was granted by the Board of Trustees. Even so, and despite Bonser’s being “the best man in the country on Practical Arts Education in general,” his main concern was not industrial arts, Bigelow would write later to Russell. “Teachers College and Professor Bonser made a great mistake when it was decided that he should be transferred to Elementary Education” (Bigelow, 1920, p. 1).

Implications and Conclusions

Bonser and Mossman defined *industrial arts* as “a study of the changes made by man in the forms of materials . . . and of the problems of life related to those changes” (1923, p. 5); *technology education* is an “educational program concerned with technical means . . . with industry . . . and their socio-cultural impacts” (AIAA, 1985, p. 25).

In the general-education interpretation technology education clearly claims as its heritage, industrial arts was to be a study of society and of cultures, present and past. It seems clear that historically, technology education has chosen the Teachers College philosophy of technology and industrial edu

cation over other available models. Lamentably, it has also chosen to ignore the rationale for including the subject in the public school curriculum.

It might be argued that a seventy-year-old philosophy may not be most appropriate today. After all, seventy years ago technology was different; society, certainly, was different. In the US, the study of education was still in its infancy. "Social studies" was a new subject in schools; so was industrial arts. But for whatever reason, the technology education profession continues, as exemplified by the above definition of *technology education*, to recognize the fundamental importance of social-industrial education. Mathematics is not mentioned in the definition of technology education. Science is not mentioned in the definition of technology education. The study of society and culture is.

At some point, the profession must decide its identity (Lewis, 1994). So far it has chosen "high-tech" content over methodology (Zuga & Bjorkquist, 1989, p. 69) and "largely ignored" the "social purpose" advocated by Bonser and Mossman (Zuga, 1994, p. 83). In addition to the profession's abandonment of social-industrial content, the Mossman-Bonser "units of work" methodology has been replaced by "the modular approach" in many programs (see also Petrina, 1994). The implication of this is that the content of technology education is so technical and asocial that its components can be presented in isolation from each other and in random order to achieve the desired effect. In fact, the only large-scale remnant of the social orientation of industrial arts is in official definitions.

Can it be put more plainly? The entire idea behind the inception of industrial arts was that it should be a social study to replace the disjointed, acultural, overly technical manual training *status quo*. It is highly ironic that the profession which adopted this radical philosophy is today returning to the state which demanded its very creation.

References

- American Council for Elementary School Industrial Arts (ACESIA). (1971). *Books: An annotated bibliography*. Washington, DC: Author.
- American Industrial Arts Association. (1985). *Technology education: a perspective on implementation*. Reston, VA: AIAA.
- Anderson, L. (1926). *A history of manual and industrial school education*. New York: Appleton.
- Bawden, W. (1950). *Leaders in industrial education*. Milwaukee: Bruce.
- Bigelow, M. (1916). [Letter to James E. Russell dated 4/18/16].
- Bigelow, M. (1920). [Letter to James E. Russell dated 2/21/20].
- Bonser, F. & Mossman, L. (1923). *Industrial arts for elementary schools*. New York: MacMillan.

- Bonser, F. (1910). *Fundamental values in industrial education*. New York: Teacher's College, Columbia University.
- Bonser, F. (1920a). Implications for elementary education from experiments in democratizing industry. *Teachers College Record* 21(1), 108-116.
- Bonser, F. (1920b). The new status of the practical arts in the problem of education. *Teachers College Record* 21(3), 238-245.
- Bonser, F. (1922). Industrial arts as a factor in the education of the citizen. *Teachers College Record* 23(1), 121-125.
- Bonser, F. (1927a). Activity curricula and industrial arts. *Journal of Educational Method* 6, 387-91.
- Bonser, F. (1927b). Industrial arts as a social study. *School and Society* 25, 675-679.
- Bonser, F. (1929). Home economics in the elementary school. *The Virginia Teacher* 10, 73-77.
- Brown, K. (1977). *Model of a theoretical base for industrial arts education*. Washington: American Industrial Arts Association.
- Feirer, J. & Lindbeck, J. (1964). *Industrial Arts Education*. New York: Center for Applied Research in Education.
- Fisher, B. (1967). *Industrial education*. Madison: University of Wisconsin Press.
- Foster, P. (1993). [Unpublished Master's Thesis, Ball State University, Muncie, IN].
- Foster, P. (1994a). Must we MST? *Journal of Technology Education* 6(1), 76-84.
- Foster, P. (1994b). Technology education: AKA industrial arts. *Journal of Technology Education* 5(2), 15-30.
- Gunther, T. (1931). *Manipulative participation in the study of elementary industrial arts*. New York: Teachers College, Columbia University, Bureau of Publications.
- Hoots, W. (1974). Philosophical positions. In R. Thrower & R. Weber, (Eds.) *Industrial arts for the elementary school*. (p. 221-236). Bloomington, IL: McKnight.
- Householder, D. (1989). The emerging curriculum. *The Technology Teacher*, 48(3), 11-14.
- Kilpatrick, W. (1912). [Diary, volume 8]. [Microfilm]. New York: Teachers College, Columbia University.
- Kirkwood, J. Foster, P. & Bartow, S. (1994). Historical leaders in technology education philosophy. *Journal of Industrial Teacher Education* 32(1), 6-25.
- Krackowizer, A. (1919). *Projects in the primary grades*. Philadelphia: Lippincott.

- Lewis, T. (1994). Limits on change to technology education curriculum. *Journal of Industrial Teacher Education* 31(2), 8-27.
- McPherson, W. (1972). *An interpretation of the ideas, philosophy, and contributions of Frederick Gordon Bonser*. Unpublished doctoral dissertation. College Park: University of Maryland.
- McPherson, W. (1978). Humanism in American education: An overview. In L. Anderson (Ed). *Industrial arts in the open access curriculum*. Bloomington, IL: McKnight & McKnight.
- Miller, W. (1979). Evolution of industrial arts in the elementary school curriculum. In Martin, G. (Ed). *Industrial arts education: retrospect, prospect*. Bloomington, IL: McKnight & McKnight.
- Mossman, L. (1921). The project method in the industrial and household arts. *Teachers College Record* 22(4), 322-328.
- Mossman, L. (1927). The significance of a study of industry as a school subject. *Ohio State University Bulletin* 32(1), 284-289.
- Mossman, L. (1929a). *Principles of teaching and learning in the elementary school*. Boston: Houghton Mifflin.
- Mossman, L. (1929b). The content of the social studies in the elementary school. *Teachers College Record* 30(4), 322-333.
- Mossman, L. (1931). Frederick Gordon Bonser. *Teachers College Record* 33, 1-8.
- Mossman, L. (1938). *The activity concept: an interpretation*. New York: Mac Millan.
- Newkirk, L. (1940). *Integrated handwork for elementary schools*. New York: Silver Burdett.
- Olson, D. (1963). *Industrial arts and technology*. Englewood Cliffs, NJ: Prentice-Hall.
- Patrick, S. (1916). *The problem method in teaching industrial arts in the elementary school, using "records" as an example*. Unpublished master's essay. New York: Teachers College, Columbia University.
- Petrina, S. & Volk, K. (in press). "Time to stop putting old wine into new bottles:" The recovery of the industrial arts movement's history, vision, and ideals. *Journal of Technological Studies*.
- Petrina, S. (1994). Choosing a "MATE" in haste could mean repenting at leisure. *T.I.E.S.* 6(1), 19-20.
- Phipps, R. (1935). *Frederick Gordon Bonser: A biographical study of his life and works*. Unpublished master's thesis. Columbus: The Ohio State University.
- Russell, J. & Bonser, F. (1914). *Industrial education*. New York: Teachers College, Columbia University.
- Russell, J. (1909). The school and industrial life. *Educational Review* 37, .

- Russell, J. (n.d.). *The school and industrial life*. [Early unpublished draft].
- Scobey, M. (1968). *Teaching children about technology*. Bloomington, IL: McKnight & McKnight.
- Smith, D. (1981). Industrial arts founded. In R. Barella & R. Wright, (Eds.), *An interpretive history of industrial arts*. Bloomington, IL: McKnight.
- Snedden, D. & Warner, W. (1927). *Reconstruction of industrial arts courses*. New York: Teachers College, Columbia University.
- Sredl, H. (1964). *A history of industrial arts from 1920 to 1964*. Unpublished doctoral dissertation. Columbus: Ohio State University.
- Stilmar, C. (1912). A year's work in the industrial arts in the fifth grade, Speyer School. *Teachers College Bulletin 16*. New York: Teachers College, Columbia University.
- Stombaugh, R. (1936). *A survey of the movements culminating in industrial arts education in secondary schools*. New York: Teacher's College, Columbia University.
- Toepfer, K. (1966). *James Earl Russell and the rise of Teachers College: 1897-1915*. Unpublished doctoral dissertation. New York: Teachers College, Columbia University.
- Towers, E., Lux, D. & Ray, W. (1966). *A rationale and structure for industrial arts subject matter*. Columbus: Ohio State University.
- Vaughn, S. & Mays, A. (1924). *Content and methods of the industrial arts*. New York: The Century Co.
- Volk, K. (1993). The lineage of research and teaching. *The Technology Teacher*, 53(3), 27-28.
- Warner, W. (1928). *Policies in industrial arts education: Their application to a program for preparing teachers*. Unpublished doctoral dissertation. New York: Teachers College, Columbia University.
- Welling, J. & Calkins, C. (1923). *Social and industrial studies for the elementary grades*. Philadelphia: Lippincott.
- Wells, M. (1921). *Project curriculum*. Philadelphia: Lippincott.
- Wilber, G. (1948). *Industrial arts in general education*. Scranton, PA: International Textbook Co.
- Winslow, L. (1922). *Elementary industrial arts*. New York: Macmillan
- Wygant, F. (1959). *A history of the department of fine and industrial arts of Teachers College, Columbia University*. Unpublished doctoral dissertation. New York: Teachers College, Columbia University.
- Zuga, K. & Bjorquist, D. (1989). The search for excellence in technology education. *Journal of Technology Education*, 1(1), 69-71.
- Zuga, K. (1994). Whose authenticity? *Journal of Industrial Teacher Education*, 31(3), 79-84.