

# THE USDA GRADUATE SCHOOL: GOVERNMENT TRAINING IN STATISTICS AND ECONOMICS, 1921–1945

BY  
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*The USDA Graduate School was founded in 1921 to provide statistical and economic training to the employees of the Department of Agriculture. The school did not grant degrees, but its graduate courses were accepted for credit by a significant number of universities.*

*In subsequent years, the activities of the school grew rapidly to provide training in many different subject areas for employees from almost all federal departments. The training in statistics provided by the school was often highly advanced (instructors included Howard Tolley and, later, Edwards Deming), while the economics taught displayed an eclectic mix of standard and institutional economics. Mordecai Ezekiel taught both economics and statistics at the school, and had himself received his statistical training there. Statistics instruction in 1936 and 1937 included seminar series from R.A. Fisher and J. Neyman, and courses on the probability approach to sampling involving Lester Frankel and William Hurwitz became important after 1939. The instruction in economics was noticeably institutionalist in the period of the New Deal. Towards the end of the period considered here, the instruction in economics became narrower and more focused on agricultural economics.*

*The activities of the school provide a basis for understanding some of the sources of the relative statistical sophistication of agricultural economists and of the statistical work done in government in the interwar period. It is noteworthy that within the USDA Graduate School, and in contrast to the Cowles Commission, statistical sophistication coexisted with an approach to economics that was not predominantly neoclassical. It also provides a light on the place of institutional economics in the training of government economists through the same time span.*

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University of Victoria, BC, Canada. Many thanks are due to the staff of the USDA Graduate School for their assistance and enthusiasm for this project. Useful comments were made by my colleagues David Giles and Cornelis Van Kooten, and by Judy Klein and by anonymous referees. The research made use of USDA materials and archives held by the Graduate School and at the National Agricultural Library (USDA Graduate School Records, 1921–1967, Collection 181). Permission to reproduce material from the USDA Graduate School Bulletin is gratefully acknowledged. This research was funded by a research grant from the Social Sciences and Humanities Research Council of Canada.

## I. INTRODUCTION

The Graduate School of the United States Department of Agriculture (USDA) was founded in 1921 to provide advanced training in statistics and economics to members of the department. It began as a very small operation, but gradually expanded and then grew rapidly over the period of the New Deal. The school came to offer instruction in numerous additional areas and to government employees from outside the USDA, gradually evolving into a further training institution serving federal employees generally. The Graduate School still exists—now serving over 200,000 participants in about 1000 courses per year. Its focus has become as broad as the professional development needs of the federal civil service. Until 2009 it remained attached to the USDA as “a non-appropriated fund instrumentality (NAFI) government entity,”<sup>1</sup> but it has now severed its ties with the USDA and become a private non-profit educational institution.

Most of the discussion of the Graduate School either published or to be found in the archives deals with the history of the school from the point of view of what became its mission of professional development for the federal service as a whole.<sup>2</sup> The focus of what follows is much narrower: the specific courses and programs offered in statistics and economics and their relationship to the history of American economics and econometrics in the period up until 1945. There has been a lot of recent discussion of the role of economic and statistical expertise in government policy making (Lacy and Furner 1993; Furner and Supple 1990), but within this literature there has been less attention given to the training programs provided by government itself, and designed to generate and maintain that expertise. One partial exception to this, and one that relates closely to the present study, is Hawley’s (1990) discussion of the Bureau of Agricultural Economics (BAE). As will be seen below, the constellation of talent gathered at the BAE, together with its basic mission of linking economic and statistical research to the management of American agriculture, deeply affected the nature of the Graduate School instruction.

In the period considered here, the Graduate School offered what were often cutting-edge courses in statistics. In the 1920s and 1930s, many contributions to econometric analysis were made by a group of agricultural economists, including Mordecai Ezekiel, Howard Tolley, Frederick Waugh, Louis Bean, W.J. Spillman, Holbrook Working, and E.J. Working (Fox 1986, 1987, 1989; Banzhaf 2006).<sup>3</sup> A significant number of these people had connections with the USDA and taught at the Graduate School. What is commonly emphasized in the discussion of their work

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<sup>1</sup>This terminology came from the Graduate School’s web page before it transitioned to a private non-profit institution. The legal status of the school was long the subject of debate and confusion. The history of the debate over the school’s legal status will not be reviewed here. The Graduate School itself has four, very large, white binders of material labeled “GS History/Legal Status.”

<sup>2</sup>See Woods (1938), Kaufman (1940), Rohbraugh (1947), Brewster (1985). The school itself produced a self-evaluation in 1949 and a history in 1964 (USDA Graduate School Records, Box 18 and 20).

<sup>3</sup>For a more general look at the history of agricultural economics up until the early 1930s, see Henry C. Taylor and Anne Dewees Taylor (1952). For a general discussion of the history of econometrics, including the contributions of the agricultural economists, see Morgan (1990). Because most of the work of these agricultural economists was done in schools of agriculture in land-grant institutions and at the USDA, Banzhaf has called them “the other economics department” (2006, p. 9).

is the relative sophistication of their statistical analyses and the significance of their contributions to demand and price analysis, particularly in the areas of multiple regression methods, errors in variables issues, and identification problems. In the mid-1930s the Graduate School also hosted lecture series by luminaries such as R.A. Fisher and J. Neyman, lectures attended by many economists working on statistical projects in Washington, and a few years later the school pioneered courses on the probability approach to sample surveys. Such survey methods were coming into use in government for purposes of unemployment measurement, surveys of consumer expenditures, and the census. In the statistical instruction it offered, the school undoubtedly played a significant role in the “revolution” in US Government Statistics discussed at length by Duncan and Shelton (1978).

The Graduate School is also interesting because of its economics instruction, instruction that was both broad in subject matter and eclectic in approach.<sup>4</sup> Many economists of institutionalist persuasion became involved in the Department of Agriculture, particularly in the New Deal years. A number of these economists, including Rexford Tugwell, Mordecai Ezekiel, Louis Bean, and Gardiner Means, formed the core of a group who pursued a planning agenda as a solution to the Depression (Hawley 1996). During the New Deal period, economics instruction within the Graduate School took on a decidedly institutional cast. The institutional approach stressed the need for new forms of “social control” to correct economic problems. In this way, sophisticated statistics and institutional economics not only coexisted, but, at least in the persons of Ezekiel and Bean, who taught both statistics and economics in the school, went hand in hand, a combination that was quite unusual. The applied and “methodologically eclectic” (Banzhaf 2006, p. 9) approach found among agricultural economists broadly, and within the BAE and the Graduate School, provides something of a contrast to the other main center of econometric research in the United States, the Cowles Commission. Cowles had a more a priori theoretical orientation to econometrics, and was to become increasingly critical of less formal institutionalist approaches, culminating in Koopmans’ famous attack on Burns and Mitchell (Koopmans 1947).<sup>5</sup>

The end date of 1945 was chosen as, after that point, the training in economics became noticeably narrower, focusing primarily on agricultural economics and with the institutionalist element much attenuated. This appears to have resulted primarily from outside criticism of the research and policy advocacy associated with the BAE and a number of the social scientists in the department (Kirkendall 1966; Jewett 2011). Also, in the post-World War II period, the nature of the Graduate School moved gradually but increasingly towards that of a general provider of professional development services (Brewster 1985).

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<sup>4</sup>The relation between agricultural economics and institutionalism has to be approached quite carefully, as a substantial part of agricultural economics, the economics of Henry Taylor’s textbook, *Agricultural Economics* (Taylor 1905), for example, was what might be called generally neoclassical in its discussion of markets and prices. Nevertheless, agricultural economists had a sense of the sometimes perverse workings of agricultural markets, the problems of rural poverty, land conservation issues, and other problems brought to the fore by the Great Depression.

<sup>5</sup>The divisions between Cowles and institutionalists were less evident before Cowles moved to Chicago in 1939. Ezekiel gave papers at Cowles conferences, for example. See also Fox (1989, p. 57).

## II. OVERVIEW OF THE GRADUATE SCHOOL<sup>6</sup>

The USDA is a department of the US government that has a long history in the practice of applied statistics and economics.<sup>7</sup> In 1921 Henry Cantwell Wallace was appointed as Secretary of Agriculture, taking over a department already well known for its research in agricultural science, but that had not, under the previous secretary David Houston, encouraged further graduate training for its staff. Wallace, and his new assistant secretary, Elmer D. Ball, were of different minds. Ball, in particular, was concerned about the loss of scientists from the department and wrote to Wallace in April of 1921 suggesting “a system of graduate training within the Department” (Brewster 1985, p. 3). At the same time Wallace himself was concerned to extend the department’s expertise in the area of agricultural economics.

During the summer of 1921, Elmer Ball chaired a committee, including L.C. Gray,<sup>8</sup> then with the Office of Farm Management and Farm Economics, on the formation of a “system of advanced instruction.” The committee did find some precedents, notably a small number of courses offered at the graduate level by the Bureau of Standards. The final memorandum produced by this committee in August of 1921 recommended the provision by the department of opportunities for advanced study in order to improve the efficiency of the department’s work and to aid in the recruitment and retention of the most able people (USDA Graduate School Records, Box 18). It was recommended that instruction be informal and given outside office hours, that the school be self-supporting through the collection of fees, that arrangements be made for the acceptance of credits by other institutions, that cooperative arrangements be made with other institutions in the Washington DC area, and that department regulations be altered to encourage employees to undertake advanced training both at the school and at other universities. It was supposed that students would mostly come from the Department of Agriculture. It was not intended that the school be able to grant degrees, but that a student might fulfill a good part of the requirements for an advanced degree and transfer their credits to a degree-granting university. The committee also recommended a list of possible courses,

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<sup>6</sup>The information in the section is drawn largely from a manuscript entitled “The History of the Graduate School” (1964), and from the annual reports and catalogs of the Graduate School (USDA Graduate School Records, 1921–1976, at the National Agricultural Library, Box 1, Box 4, and Box 18). The archive at the NAL consists of twenty boxes covering the period 1921 to 1976. The material consists of announcements of course offerings, annual reports, newsletters, promotional materials, lists and copies of lectures given by guest lecturers, publications, legal memoranda, historical accounts and reports, key memos and other items relating to the founding of the school, materials relating to the twenty-fifth and fiftieth anniversaries, and documents concerning long-range planning (1948) and self-assessment reports (1962 and 1969). There are no copies of lecture notes from courses given or detailed course outlines (only brief course descriptions), and no lists of students who took courses except in a few of the early annual reports. The Graduate School itself also holds a significant amount of material relating to its history in a series of large binders labeled “History of the Graduate School.”

<sup>7</sup>In 1948, the first year these figures are available, the Department of Agriculture listed almost 14,000 employees in “research, statistics and extension” out of a total employment in the department of 82,000 (Historical Statistics of the United States, Millennial Edition On Line, Table Da 1425, US Department of Agriculture—employees: 1861–1999 and Table Da 1426–1432 US Department of Agriculture—employees by function: 1948–1999).

<sup>8</sup>L.C. Gray was a Wisconsin PhD (1911). He taught at Wisconsin until 1913 and made important contributions to the theory of exhaustible resources.

at both a “general or fundamental” level and an “advanced or graduate” level. The subjects suggested included various areas of agricultural science, statistical methods, and agricultural economics (“History of the Graduate School” 1964, p. 12).

An important related development occurred in 1922 when Wallace appointed Henry C. Taylor<sup>9</sup> as chief of the new Bureau of Agricultural Economics. Taylor also expressed concern about the level of economic and statistical expertise of his staff, and was interested in providing opportunities for further training. Despite the fact that Henry C. Wallace died in 1924, and his successor dismissed Taylor a year later, the BAE continued to grow. By 1929 “the BAE had more social scientists than the rest of the federal government combined” (Banzhaf 2006, p. 14). In terms of economics:

The BAE brought together by far the largest group of research-orientated economists that had ever been assembled in the United States and presumably in the World. It became the central institution of the agricultural economics profession, maintaining close ties with agricultural economists in land-grant colleges and experimental stations and collecting, processing, and interpreting vast quantities of statistical data (Fox 1989, p. 55).<sup>10</sup>

This cluster of statistical and economic expertise is what enabled the Graduate School to provide such high-quality instruction, as many of the instructors held positions with the BAE. Classes were held outside regular office hours, and modest fees were charged to defray costs. The Annual Reports of the Graduate School (USDA Graduate School Records, Box 4) occasionally contain information on the institutions that had given credit for their courses. Initially these tended to be institutions in the Washington DC area; for example, Mordecai Ezekiel transferred his credits to the Robert Brookings Graduate School (headed by Walton H. Hamilton, a leading institutional economist) and completed his PhD there in 1923. Over time the list of universities accepting Graduate School credits expanded to include Columbia, Cornell, Yale, Harvard, Johns Hopkins, Chicago, California, Michigan, New York, Illinois, Iowa, and numerous others. Cooperative arrangements with American University began in 1936 with the AU School of Public Affairs. A short time later American University and the USDA Graduate School were cooperating on a significant number of courses in economics, as well as a few in statistics, with the USDA Graduate School explicitly listing AU courses in its annual announcements of courses and AU giving credit for certain Graduate School courses. This arrangement

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<sup>9</sup>Henry Taylor is sometimes seen as the “father of agricultural economics.” He wrote *Agricultural Economics* (1905). He was at the University of Wisconsin until 1919 and helped found the Department of Agricultural Economics there. He was first hired to the USDA by Wallace’s predecessor. Wallace’s death in 1924 resulted in the appointment of a new secretary, William Jardine, by President Coolidge. Coolidge was not sympathetic to the BAE and its managerial aspirations. Taylor was removed as chief of the BAE in 1925 (see Hawley 1990).

<sup>10</sup>The concentration of statistical economists in the Department of Agriculture is a feature of its history and is clearly related both to the abundance of data available, on both agricultural production and prices, and to the importance of the agricultural sector in terms of economic policy. Of course, the department itself was not the only center for research on agricultural economics and agricultural statistics. Important programs in agricultural economics existed at Cornell, Wisconsin, Michigan State, Iowa State College, and elsewhere, and in 1933 Iowa State established its famous Statistical Laboratory.

with American University encountered difficulty in 1940 and ended after the 1944/45 year (Report of the Director, 1943–1944, USDA Graduate School Records, Box 4).<sup>11</sup>

The Graduate School grew in terms of numbers of courses offered and numbers of students, eventually moving well beyond the original vision and becoming by far the most substantial center for training in the federal government outside the armed forces. Training programs were also offered by the Bureau of Standards, the Bureau of the Census, the Department of Commerce, and the Farm Credit Administration, as well as a number of other agencies, but these were small in comparison, and their courses were more focused on specific job skills (Elliott 1940).<sup>12</sup> In 1921 the Graduate School offered eleven courses, and the number of courses remained quite small until expanding in the early 1930s and again in the mid-1930s, reaching forty-three in the 1935/36 year, including eight courses in economics, five in mathematics and statistics, and a substantial number of language courses, as well as technical courses in subjects such as photography and glass blowing.<sup>13</sup> The arrival of the New Deal had substantial effects along a number of dimensions. In 1933 Henry A. Wallace<sup>14</sup> became Secretary of Agriculture, and Wallace brought with him both a background in agricultural statistics and a fervent belief in the New Deal programs for agriculture. In 1933 the Department of Agriculture had 26,544 employees, but this almost doubled by 1936 and doubled again to 106,217 in 1937.<sup>15</sup> The numbers of courses, course enrolments, and the range of instructors available to the school all increased substantially. The extent of the Graduate School's activity increased dramatically, and this increase was sustained through the 1940s. In 1941/42 year, its twentieth-anniversary year, the Graduate School listed a total of 127 courses offered in the fall and 118 in the spring, as well as 16 courses in the summer. The courses available from American University were in addition to these. In economics, the Graduate School offered an undergraduate course in principles, ten courses described as "Graduate and Advanced Undergraduate" (plus another seven cross-listed with AU), and six "Graduate Courses" (plus three cross-listed with AU). In statistics there were six undergraduate courses listed, four "Graduate and Advanced Undergraduate," and eleven "Graduate Courses" (plus two cross-listed with AU) (USDA Graduate School Records, Box 1, Catalogs 1921–1956).

The 1940 year saw the establishment of subject-matter departments replacing the original system of subject-matter subcommittees, which had, by then, virtually ceased to exist outside economics. The following eight departments were set up: Biological

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<sup>11</sup>AU and George Washington University eventually refused to give credit for USDA Graduate School courses on the grounds that these courses were subsidized by government and represented unfair competition.

<sup>12</sup>According to the report by Elliott (1940), in 1939–40 the Department of Commerce offered seven courses in Spanish, French, and German, and Public Speaking; the Bureau of Standards offered about nine courses in scientific subjects and in mathematics; the Bureau of the Census offered five courses, two of which were in statistics; and the Farm Credit Bureau offered courses mostly of a secretarial nature except for three dealing with Farm Credit, Land Values, and Farm Cooperatives.

<sup>13</sup>Glass blowing was intended to train people in the production of laboratory equipment.

<sup>14</sup>H.A. Wallace was H.C. Wallace's son. The senior Wallace was Secretary of Agriculture from 1921 until 1924, the junior Wallace from 1933 to 1940. In 1940 he was elected vice-president. H.A. Wallace was well known for his work on machine computation that he first presented at Iowa State College in 1924 (see David 1998).

<sup>15</sup>Historical Statistics of the United States, Millennial Edition On Line, Table Da 1425, US Department of Agriculture—employees: 1861–1999.

Sciences (including biology, botany, genetics, bacteriology, plant and animal pathology, and cytology), Physical Sciences (chemistry, physics, meteorology, astronomy, geography, and soil sciences), Mathematics and Statistics, Engineering and Mechanical Arts (architectural and mechanical drawing, engineering, graphic presentation, and glass blowing), Language Aids (foreign languages, English, literature and drama, editing and writing, and speech), Social Sciences (economics, history, sociology, philosophy, psychology, and public law), Public Administration (management and supervision, accounting and auditing, financial administration, administrative law, personnel administration, and public relations), and Office Skills (secretarial training, clerical training, shorthand, office procedures, government correspondence, and business English). This system remained in effect through the period considered here ("History of the Graduate School" 1964, pp. 20–23).

The student body saw related changes. The total number of course registrations began in the 1921/22 year at 319. This number rose to 414 the following year, and then declined to 111 in 1926/27 before starting an upward climb to 505 in 1930/31, then dipping again in the next few years, reaching the low 290s in 1932/33 and 1933/34. From then on, the numbers rose steadily, reaching 7,863 in 1944/45. As these numbers indicate, the student body developed well beyond the Department of Agriculture, and the Graduate School became the provider of further educational opportunities for the federal civil service broadly. This shift began in the mid-1930s as a result of other government agencies asking for permission to let their employees attend classes, and again was accelerated by the demands of the New Deal. The first year in which a breakdown is given is for 1931/32, when 291 course registrations were from members of the USDA and 194 from outside the department. Ten years later there were 1,369 course registrations in the fall and spring terms from within the USDA and 4,858 from other departments and agencies. Employees from the Census, and from the departments of Commerce, Labor, Treasury, Social Security Administration, and many other agencies became well represented.

### III. INSTRUCTION IN STATISTICS

For many years the Graduate School offerings in statistics were quite limited (see Table 1). Initially, an introductory statistics course was given and a single advanced

**Table 1.** Statistics Courses Offered: Selected Years, 1927/28–1936/37 (Graduate Level)

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1927/28:
Advanced Statistical Methods
1933/34:
Advanced Statistical Methods
Adjustment of Observations
1936/37:
Mathematical Preparation for Statistics
Differential Equations
Advanced Statistical Methods
Adjustment of Observations

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(Source: USDA Graduate School Records, Box 1, Catalogs 1921–1956)

statistical methods course. From the fall of 1923 onwards, this advanced course was listed at the graduate level. From 1921 through to the 1925/26 year, Advanced Statistical Methods was taught primarily by Howard Tolley.<sup>16</sup> The course covered a full year (two terms) and used Yule's *Introduction to the Theory of Statistics* (1911). The course descriptions vary a little, but one term generally dealt with correlation (simple and multiple), curve fitting and applications, and the other term with the theory of sampling and its applications, and/or time series and index numbers. It was from Tolley's course that Ezekiel first "got started on statistics" (Ezekiel 1957, pp. 1–6). In 1926, a few years after completing his PhD at the Brookings Graduate School, Ezekiel returned to the Graduate School as an assistant to Tolley in teaching the advanced course.<sup>17</sup> The course was taught jointly by Tolley and Ezekiel for the next three years, and then for one year by C.F. Sarle and E.J. Working.<sup>18</sup> At this point the course is described as dealing in the first term with the theory of sampling and its application to the collection and analysis of statistical data (using the text by Yule), and in the second term as covering simple and multiple correlation, both linear and curvilinear, and problems of time series analysis, using Ezekiel's new book *Methods of Correlation Analysis* (Ezekiel 1930). The course was taught by Ezekiel again in 1931, but only for a term before being taken over by C.M. Purvis. The course content remained much the same, but R.A. Fisher's *Statistical Methods for Research Workers* (1928) was used in addition to Yule's and Ezekiel's books.

In addition to courses, the Graduate School often played host to visitors who gave lectures or series of lectures. R.A. Fisher gave two lectures at the school on the "Development of the Modern Concepts of Statistical Theory" in the 1930/31 year. Unfortunately, copies of these lectures do not appear to be available in the archives of the school.

This period was also one during which Ezekiel, Tolley, and E.J. Working made important contributions to applied statistics. Working was closely involved with the debates surrounding the statistical estimation of demand relationships (Working 1927). Tolley and Ezekiel (1923) presented the Dolittle method for computing multiple correlations and regressions, and Ezekiel (1924) developed his graphical method for dealing with curvilinear multiple regression problems. Louis Bean<sup>19</sup> (of whom more below) developed a shortcut method (Bean 1929). Ezekiel's 1930 book *Methods of Correlation Analysis* was primarily concerned with what would now be called applied regression analysis. According to Fox, "Ezekiel's book was definitely on the frontier" and "by far the most comprehensive work on applied regression analysis published up to that time" (Fox 1989, p. 67). It was clearly Ezekiel's intent to make the most recent work of "Student" and R.A. Fisher available

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<sup>16</sup>Howard Tolley worked at the BAE from 1922 to 1930, becoming Assistant Chief in 1928. After a few years at the University of California, he returned to head the BAE from 1934 until 1946, when he resigned under pressure.

<sup>17</sup>Ezekiel, at that point, was working for the USDA. He became Assistant Chief Economist of the Farm Board in 1930, and then from 1933 to 1944 Economic Adviser to the Secretary of Agriculture. From 1944 to 1947 he was with the BAE. Ezekiel was closely involved in the drafting of the Agricultural Adjustment Act of 1933.

<sup>18</sup>Then both with the BAE.

<sup>19</sup>Louis Bean had an MBA from Harvard and worked in the BAE. He became an economic adviser in the Agricultural Adjustment Administration, where he worked closely with Ezekiel.



to his audience, and, to that end, he engaged in correspondence with Fisher to ensure his interpretations were correct (Aldrich 2000, pp.160–163; 2010). Thus, while the Graduate School was offering only a single graduate-level course in statistics, it was a highly advanced course for its time.

Several things occurred in and around 1933 to change the instructional program in statistics. Edwards Deming<sup>20</sup> began teaching at the school in 1933, and he offered a new full-year course (in addition to Advanced Statistical Analysis) called Adjustment of Observations. In the first term the course dealt with the theory of errors, Fisher's fiducial tests of hypotheses respecting parent populations. Bayes' theorem, Laplace's generalization, and the posterior method of estimation were applied and compared with fiducial inference. No text was used but papers by Helmert, Gosset ("Student"), R.A. Fisher, Karl Pearson, J. Neyman, Egon Pearson, Shewhart, Keynes, Molina, and Wilkinson were used. The second term treated the subject of least squares and empirical curves from the "general and simplifying view point made possible by recent developments." Various methods of estimating the parameters of an empirical formula were discussed and some attention given to Karl Pearson's Chi-square test for goodness of fit (USDA Graduate School Records, Box 1, Announcement, September 1933, p. 6). This course, together with the Advanced Statistical Analysis course, gradually became more elaborate but remained the core of the statistics teaching at the Graduate School through the 1937/38 year. Some other courses were introduced. In 1935/36 Deming offered a course in Advanced Mathematics for Students in Economic Theory and Statistics, covering both linear algebra and calculus, including Taylor series, moments of curves, the Jacobian, and various topics in integration. Later in the same year, an Intermediate Mathematics for Students in Economic Theory and Statistics course was introduced, designed to "move along somewhat slower" than the advanced course. In following years, these courses developed into a substantial series of courses in Mathematical Preparation for Statistics and courses in Differential Equations and Applications. In the 1937/38 year M.A. Girshick<sup>21</sup> began teaching at the Graduate School, offering courses on Multivariate Analysis including "higher algebra" and mathematical statistics.

In September of 1936 R.A. Fisher visited the Graduate School, and gave three lectures on the subject of "Statistical Inference and the Testing of Hypotheses." In April 1937 J. Neyman visited, and gave a series of lectures and conferences. Neyman's lectures were on the theory of probability, probability and experimentation, and on the testing of statistical hypotheses. The conferences concerned issues involving field experiments, plant breeding, statistical methods in economic and social research (census by sampling and other problems), time series and related problems in economics, statistical estimation, and an "outline" of the theory of confidence intervals. Both these sets of lectures, and the conferences and discussions, were printed up and published by the Graduate School (Fisher 1936; Neyman 1938a). Neyman's lectures, in particular, involved issues at the forefront of statistical research at the time, and brought attention to Neyman's 1934 article on the representative method (Neyman 1934). Issues relating to sampling were just then coming to the

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<sup>20</sup>W. Edwards Deming had a PhD from Yale, and had studied with Fisher, Pearson, and Neyman in England. He was employed as a physicist in the Bureau of Chemistry and Soils.

<sup>21</sup>Girshick had studied under Wald at Columbia, where he received his PhD. He later joined RAND.

forefront of government statistical work due to the 1937 “Check Census of Unemployment” (Duncan and Shelton 1978, p. 44). Neyman opened the conference on statistical methods in social and economic research by posing questions about the best method of sampling from a population. Neyman emphatically rejected the method of “purposive selection,” and argued instead for the method of random sampling (Neyman 1938a, pp. 89–90). Those recorded as participating in discussions with Fisher and Neyman included Milton Friedman and Sidney Wilcox, who were then working on a survey of family expenditures.<sup>22</sup> Friedman’s questions to Neyman involved the issue of ranked data in taking a sample from a full survey. As a direct result, Neyman wrote a paper dealing with this issue, suggesting a solution based on his concept of inductive behavior (Neyman 1938b; see also Friedman 1937).<sup>23</sup> The following year two lectures were given by Frank Yates (on the design of factorial experiments and contrasts between the methods of correlation and regression), and a series of four lectures on “The Statistical Method from the Viewpoint of Quality Control” were given by Walter Shewhart.<sup>24</sup> Later, Deming regularly offered courses on quality control, and this became an area in which he published widely and established an international reputation.

From about 1939–40 the offerings in mathematics and statistics underwent a very considerable expansion. The archives do not provide a specific reason for this, but its timing is coincident with the huge expansion of government statistical work related to the New Deal and, a little later, to the requirements of wartime planning. Large numbers of students came from the Department of Commerce, and the training provided in statistics seems to be designed to accommodate individuals with little previous background. The list of courses for 1940/41 is divided into two categories: mathematical preparation for statistics; and statistics. The former lists a total of fifteen courses, some offered only every two, three, or four years. Of these, six are listed as undergraduate (including basic algebra, calculus, and analytic geometry), and the rest as advanced undergraduate and graduate (including calculus, differential equations, linear algebra, interpolation and finite differences, theory of functions). In statistics seven undergraduate courses (some with multiple sections) and fourteen advanced undergraduate and graduate courses are listed. Again it is clear that there is a rotation of some of these courses over a period of two or three years. Among the advanced courses listed are Graphic Correlation (Bean), Theory of Probability (Girshick), Adjustment of Observations (Deming), Least Squares (Deming), Multivariate Analysis (Girshick), and Analysis of Variance (Girshick). In addition, the Graduate School began offering leading-edge courses on sampling theory and methods (USDA Graduate School Records, Box 1, Educational Courses, 1940–41).

As mentioned above, sampling methods had been experimented with in 1937 with the check census of unemployment, but “the first practical application of probability sampling to a current reporting system in the Federal Government appears to have been the Sample Survey of Unemployment, which was put into operation at the

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<sup>22</sup>This was being undertaken for the National Resources Committee. For discussion on this and other work on consumption during the New Deal, see Stapleford (2007).

<sup>23</sup>For discussion of Friedman’s problem and Neyman’s solution, see Teira (2007).

<sup>24</sup>These lectures were also published by the Graduate School (Shewhart 1939).

beginning of 1940 by the Works Progress Administration” (Duncan and Shelton 1978, p. 47). This survey was conducted by J. Stevens Stock and Lester R. Frankel<sup>25</sup> (Frankel and Stock 1942). Following on from Neyman’s lectures in 1937, the next instruction in sampling methods given at the Graduate School was in the form of two lectures given in October 1938 by Frederick F. Stephan as a part of the course Special Topics in Statistics. This was followed by two lectures from W.G. Cochran in January 1939 and a full-term course, added in the spring of 1940, on Sampling Methods in Social and Economic Data, taught by Stock and Frankel themselves. This was only the second course on sampling to be offered anywhere in the world (Frankel and King 1996, p. 70).<sup>26</sup> The 1940/41 course listings include two courses on sampling, the Stock and Frankel course noted above, and a course on the Theory of Sampling taught by J. Cornfield and W.D. Evans. Sample methods were also introduced into the decennial census in 1940, and Edwards Deming became Mathematical Advisor to the Census Bureau. In the 1941/42 year a course on Theory of Sample Surveys was added, given by William Madow and William Hurwitz,<sup>27</sup> and from the 1943/44 year Deming organized a regular seminar on sampling. M.H. Hansen also taught along with Madow and Hurwitz, and notes from their courses on sampling became the basis for their 1953 textbook (Hansen, Hurwitz, and Madow 1953).

A further formalization of the program in statistics came in the 1942/43 year with the availability of “Certified Statements of Accomplishment in Statistics.” These could be achieved in one of four areas of concentration: processing of data; social sciences; biological and physical sciences; and design and interpretation of sampling surveys. In this particular year, Milton Friedman offered a course on Statistical Analysis of Economic and Social Problems. Also listed is a course on Statistics of Agricultural Economics given by Frederick V. Waugh.<sup>28</sup> Friedman’s course was described as “Selected topics in the application of statistical methods to demand and cost curves, business cycles, income distribution, measurement of inflationary gaps, etc.” (USDA Graduate School Records, Box 1, Bulletin of Information and Courses 1942–43, p 18). The full program of courses for the Certified Statement of Accomplishment in Statistics in the Social Sciences for the 1942/43 year is reproduced in Appendix 1 (USDA Graduate School Records, Box 1, Bulletin of Information and Courses 1942–43, pp 10–11). Table 2 lists only the graduate-level courses that were a part of the certificate program in the field of social sciences.

Friedman did not teach at the Graduate School again, but Waugh continued to offer courses in agricultural economics and social welfare issues (see below). Other notables involved in statistics instruction at this time were the biostatistician Jerome Cornfield, later involved in the debate over smoking and cancer, and Solomon Kullback, who became involved in the statistics associated with information theory (the Kullback–Liebler information measure). Overall, the certificate program provided training in mathematics and applied statistics of a type that would have been difficult to obtain at other graduate schools. This program remained largely the same

<sup>25</sup>Frankel had been a student of Harold Hotelling’s at Columbia.

<sup>26</sup>The first such course was offered at Iowa State in the spring of 1939 by W.G. Cochran.

<sup>27</sup>Hurwitz was another Columbia student and a statistician with the Bureau of the Census.

<sup>28</sup>Waugh was a Columbia PhD and then went to Europe, where he worked with Frisch. He was a member of the BAE, but taught at the school only from 1942 (Fox 1989).

**Table 2.** Statistics Courses Listed for the Certificate Program in Statistics, 1942/43  
(Social Science; Graduate Level)

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Interpretations of Statistical Calculations
Planning of Statistical Inquiries
Office Procedures and Estimates
Sampling in Social and Economic Surveys
Theory of Sampling
Population Statistics
Statistical Analysis of Economic and Social Problems
Statistics of Agricultural Economics
Psychological and Educational Statistics

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(Source: USDA Graduate School Records, Box 1, Catalogs 1921–1956)

through the rest of the period considered here, although by 1947 Girshick, Stock, and Frankel had all ceased to teach at the Graduate School.

Outside actual course offerings, Harold Hotelling gave a series of lectures in the spring of 1941, but copies of the lectures are not in the archives. The second edition of Ezekiel's *Methods of Correlation Analysis* appeared in 1941. Deming and Girshick provided advice on the “more mathematical sections” and especially those dealing with “the sampling significance of results” (Fox 1989, p. 67). Between 1943 and 1946, Girshick was working with T. Haavelmo at Cowles on a five equation model of the US demand for food using the limited-information maximum likelihood method (Fox 1989, p. 57). Waugh was also on the forefront of statistical research, becoming “the first economist to apply Hotelling's method of canonical correlation” (Fox 1989, p. 69; Waugh 1942).

#### IV. INSTRUCTION IN ECONOMICS

In terms of economic instruction, the offerings in the early years were both few in number and quite variable. In the first few years, there was a clear focus on agricultural economics. The 1921/22 year saw, in the first term, Henry Taylor teach a course on agricultural economics and, in the second term, a course on the Economics of Commodity Marketing was offered and a course on Agricultural Prices taught by O.C. Stine.<sup>29</sup> In 1921 and 1922 Mordecai Ezekiel was a student and took agricultural economics from Taylor, and a seminar given by John D. Black on production economics.

The following year (1922/23) saw a division into general and graduate courses with a general-level course, Elementary Agricultural Economics, taught by L.C. Gray, and a graduate course, Advanced Economic Theory, taught by Taylor and C.L. Stewart in the first term, followed by a course on Land Economics in the second term, listed as being taught by Gray and by Richard T. Ely, who was in Washington that term.<sup>30</sup> The course description provided for Advanced Economic Theory is interesting. It is

<sup>29</sup>O.C. Stine was a well-known agricultural economist, trained at Ohio and Wisconsin, and became head of the Division of Statistical and Historical Research at the BAE.

<sup>30</sup>It is not clear from the available material whether Ely did participate in the instruction of this course.

described as “A review of important economic theories and their application to present day problems” and “A critical study of the principal schools of economic thought, such as the English Classical School, the German Historical School, and the Austrian Psychological School” (USDA Graduate School Records, Box 1, Announcement 1922–23, p. 2). This was clearly a course in general economics rather than one with an agricultural focus. The next year (1923/24) the graduate courses changed completely with a course on Credit, Currency and Prices with Special Reference to the Influence of the Federal Reserve System being offered in the first term by E.A. Goldenweiser, and a course on Economic Cycles offered in the second term by Walter W. Stewart. Stewart had been a colleague and student of Veblen’s at Missouri, and a colleague of Walton Hamilton’s at Amherst before joining the Federal Reserve to develop their Research and Statistics Division in 1922.<sup>31</sup>

The next two years show very little economics instruction, with only one half-year course on international trade (with reference to agriculture) actually being offered. A summary view of the graduate-level courses offered in economics in subsequent years is given in Table 3. In the 1926/27 year a course in Price and Price Relationships, taught over a full year by Ezekiel and Louis Bean, was introduced. The first half dealt with Price Movements and Business Cycles and the second with the Economic Basis of Price Analysis, with both parts of the course much concerned with the statistical analysis of price movements. Agricultural prices were a part of this, but the course dealt with a broader range of empirical work on prices and price movements. In 1928/29 Bean’s part of the course was replaced by a term on consumption economics taught by Warren Waite.<sup>32</sup> This configuration continued into the next year, but with Bean returning with a course on Business Cycles in Relation to Agriculture that he offered in most years until 1933/34 (as a full-year course from 1931/32). The course on Price and Price Relationships was replaced in 1930/31 by a year-long course in Economic Theory taught by E.J. Working and C.F. Sarle. The following year a one-term version of the Price and Price relationships course was taught by E.J. Working, and a one-term seminar in Elementary Mathematical Economics was offered (but withdrawn after a few weeks for lack of students) by Ezekiel. In addition to this, a course in the History of American Agriculture taught by Everett Edwards<sup>33</sup> was introduced in 1927/28. The course focused on social and economic history, and became a staple offering, continuing throughout the period considered in this paper and growing from a one-term to a full-year course.

The majority of these courses were taught with a relation to agriculture and agricultural issues, agricultural prices, and agricultural markets, but they were not all focused on agriculture. Many were more empirical than theoretical, and cannot be described as having a neoclassical character. Ezekiel’s course on prices spent time on different methods of arriving at prices, identification issues, issues of time and dynamics, price trends and levels, and seasonal and periodic variations. Waite’s course on consumption started with the social and economic conditions that affect

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<sup>31</sup>For discussion of Stewart’s career at the Federal Reserve, see Yohe (1982). For his connections with Walton Hamilton, see Rutherford (2003). Goldenweiser was at that time Assistant Chief Statistician, Federal Reserve Board.

<sup>32</sup>Senior Agricultural Economist, BAE.

<sup>33</sup>Agricultural Economist, BAE.

**Table 3.** Economics Courses Offered: Selected Years, 1927/28–1936/37 (Graduate Level)

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1927/28:
Price and Price Relationships
History of American Agriculture
1933/34:
Theory of Price and Price Making
Business Cycles in Relation to Agriculture
History of American Agriculture
1936/37:
Agricultural Prices
History of American Agriculture
Contemporary Economic Problems
Economics of Instability
History of Economic Thought
Evolution of Economic Institutions
The Rise of Modern Industrialism in the United States
Wages and Economic Insecurity
International Trade
Graduate Seminar in General Economics

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(Source: USDA Graduate School Records, Box 1, Catalogs 1921–1956)

consumption, the effect of changes in income and price on consumption, elasticity, and “changes in consuming habits of the people.” Bean’s course on cycles in relation to agriculture discussed the place of agriculture in various cycle theories, and the relationship between the agricultural and industrial sectors of the economy: the influence of such things as industrial and financial conditions; employment; the purchasing power of “city consumers” on agricultural prices and incomes; and the impact of agricultural conditions on business activity.

The Economic Theory course given by E.J. Working and C.F. Sarle in 1930/31 is particularly interesting as Working was more orientated to neoclassical theory than were Ezekiel or Bean. It is clear the course was intended to be a course in theory, and the course description contains a pitch for the importance of economic theory for the “best work” in applied economics. The description, however, continues as follows:

Current theories of value and distribution as developed by Classical, Austrian, and Neo-Classical schools of economic thought will be analyzed [sic] and appraised. The course is intended to enable the student to develop an understanding of the “traditional” economic doctrine and to give him a basis for judging the merits of those parts of economic theory concerning which there is ground for divergence of opinion. Some attention will be given to the doctrines as developed by the Historical, Mathematical, and Institutional schools of economics (USDA Graduate School Records, Box 1, Announcement 1930–1931).

Ezekiel’s proposed seminar in Mathematical Economics is also of interest, both because he thought of offering such a course at all at that time and because his description indicates both an interest and a concern. The course is described as paying

“as much attention to the validity of the assumptions under existing economic conditions as to the theory itself,” while at the same time claiming that mathematical economics is “basic to much of the research work in economic statistics and economic research” (USDA Graduate School Records, Box 1, Announcement, January 1932).

One other Graduate School event should be mentioned. Over the period February and March 1930, the school organized a series called “Special Lectures in Economics.” This included E.B. Wilson talking on “Scientific Method in Economic Research,” John R. Commons on “Evaluating Institutions as a Factor in Economic Change,” Frank Knight on “Fact and Interpretation in Economics,” and John D. Black on “Analytic Methods in Agricultural Economic Research” (USDA Graduate School Records, Box 7, Lectures). Wilson discussed mathematical and statistical methods (sampling, regression, and time series). He clearly felt mathematical methods were necessary for certain complex problems, but also argued that the mathematical method was “likely largely to remain the work of a small fraction of the students in economics” (USDA 1930, p. 4). Commons, of course, stressed the importance of institutions in human behavior, the importance of participation as a method of inquiry into the functioning of institutions, the role of the courts, his concept of reasonable value, and the importance, for the evaluation of agricultural policy, of the distinction between cooperative marketing and collective bargaining. Knight provided his usual critique of scientism and of notions of “social control.” In his lecture, Black distinguished between pure science, specialized pure science, and applied science, and emphasized the significant contributions to be made by agricultural economics in the specialized pure science type (rather than in more applied work). Black argued for a mixture of methods, historical and cross-sectional, quantitative and qualitative, but was somewhat critical of the “institutional approach” for failing to develop and apply more analytical methods to their subject matter:

I fear that I am compelled to state that thus far institutional analysis has reached only the point of cross-sectional description and historical narration in qualitative terms. The institutional writers content themselves with talking about institutions, telling us what they are like and along what lines they have evolved. . . . The time has about come when the institutional researchers will need to do something more than talk about their institutions, when they will need to weigh them and measure their attributes, and then show the amount of social force they have exerted in the past, and are exerting in the present (USDA 1930, p. 33).

The instruction offered, then, included consideration of the then-current debates between institutional and more orthodox economics.

Economics instruction over the course of the 1930s expanded significantly, and took on a cast affected both by new developments in economics and the problems and issues of the Depression and the New Deal. The 1933/34 year saw the descriptions of Bean’s course on Business Cycles in Relation to Agriculture make specific reference to the 1929–1933 depression and the efforts made to initiate revival. The course, however, does not appear to have actually been given, and dropped out of the listings in subsequent years. H.J. Wadleigh<sup>34</sup> offered a full-year course Theory of Prices and

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<sup>34</sup>Wadleigh was a member of the BAE, and then Senior Economic Analyst, Department of State.

Price Making, the second part of which dealt with theories of imperfect competition, monetary and business cycle theory, and “the institutional school of economics,” as well as “welfare economics and social control.” The following year the course title was changed to Recent Developments in Economic Theory with the focus primarily on new developments in imperfect competition and monetary economics and business cycles, including Keynes’ *Treatise on Money*. This was clearly a very up-to-date course.

A new course on the History of Economic Thought taught by Max Wasserman was introduced in 1934/35.<sup>35</sup> The last part of this course covered “recent and modern developments” defined as institutional, quantitative, and welfare economics, and including Veblen, Pigou, J.M. Clark, J.R. Commons, and R.G. Tugwell. Wasserman also taught a course on Inflation in Theory and Practice (USDA Graduate School Records, Box 1, Announcement, August 1934).<sup>36</sup> The year after (1935/36), Wasserman introduced a Graduate Seminar in Economics and a course in Money and Banking. That year also saw a long series of twenty-two lectures in “Current Economic Problems,” including lectures by Alvin Hansen, Isador Lubin, Calvin Hoover, Jacob Viner, Eveline Burns, Joseph Schumpeter, E.A. Goldenweiser, H. Parker Willis, Edwin Nourse, Morris Cooke, David Saposs, Clarence Ayres,<sup>37</sup> and Harold Moulton. Outside economics, courses were offered in Administrative Law, and Federal Jurisdiction and Procedure, both containing material on legal questions concerning New Deal legislation. This serves to indicate the impact on the Graduate School of the latest economic thinking and the increasing role of the State in the economy.

The next year saw a vast increase in the offerings in economics, many of which were general in nature. This can be linked to what Andrew Jewett has called “the cultural turn” at the USDA in the 1930s (Jewett 2011). The offerings included the Graduate Seminar (Wasserman), History of Economics (Wasserman), Contemporary Economic Problems (Wasserman), History of American Agriculture (Edwards), Economics of Instability (Ezekiel and Bean), Wages and Economic Insecurity (Edward Berman),<sup>38</sup> The Rise of Modern Industrialism in the US (James Wood), Evolution of Economic Institutions (M.T. Wermel),<sup>39</sup> Agricultural Prices (F. L. Thomsen),<sup>40</sup> and International Trade (L. Volin). The courses on Trade and the Rise of Modern Industrialism were offered but not given. Courses in Economics in French and Economics in German were offered and given.

<sup>35</sup>Wasserman was Economic Advisor, Resettlement Administration.

<sup>36</sup>An undergraduate course in introductory economics was also reintroduced, taught by L. Volin and then by E.W. Braun. Volin was with the BAE.

<sup>37</sup>Ayres was briefly involved in the New Deal as Director of the Consumers’ Division, taking over from his friend Walton Hamilton. Ayres’ lecture concerned Government and the Consumer.

<sup>38</sup>Berman taught at the University of Illinois and wrote *Labor and the Sherman Act* (1930), which contained a brief introduction by John R. Commons and a foreword by Felix Frankfurter. He was Senior Economist, Works Progress Administration.

<sup>39</sup>Wermel was an economist with the Resettlement Administration, and wrote *The Evolution of the Classical Wage Theory* (1939).

<sup>40</sup>Thomsen was a PhD from Wisconsin and a Senior Agricultural Economist, BAE. In 1939 this course was taught jointly with O.C. Stine.



Wasserman's course, *Contemporary Economic Problems*, dealt with a range of issues, including necessary reforms to the capitalist system, problems of machine industry, agricultural problems, control of industry and trade, unemployment, social security, consumer protection, housing, and wages and hours of work. *Wages and Economic Insecurity* covered a vast range of issues in labor economics and labor legislation with a distinctly Wisconsin orientation. The course on *Economic Institutions* is described as examining the fundamental institutions of modern capitalism, "such as Private Property, the Price System, Machine Technique, and Business Enterprise," a series of topics utilizing a noticeably Veblenian terminology (USDA Graduate School Records, Box 1, Announcement, September 1936). These courses were supplemented by ten lectures on "Frontiers of Law and Economics," but no details of this series could be found. A lecture series was also given on the USDA and its objectives, including a lecture by R.G. Tugwell on Conservation and Land Use. Courses such as these represent a very explicit consideration of general issues of institutions and institutional reform, which undoubtedly carried with it a positive view of the potential role of State intervention and management of the economy, both in agriculture and beyond.

Many of these courses (or close substitutes for them) were also offered in the following two years, along with *Money and Banking* (Wasserman), *Comparative Current Economic Systems* (Berman), and *Political Economy and the Law* (Joseph Blandi).<sup>41</sup> Courses on *Trade Unionism and Labor Law* (Berman) replaced *Wages and Economic Insecurity*, with the latter course giving particular attention to the Wagner Act, Social Security legislation, decisions affecting minimum wage laws, and "the controversy over the Supreme Court" (USDA Graduate School Records, Box 1, Announcement, September 1937). In the following year courses on *Labor Law and Labor Problems and Policies* were offered by David Ziskind,<sup>42</sup> and a course on *Current Social Legislation* and a course on *The Development of English Economic and Governmental Institutions* were also offered.

In this period many of the courses had a focus on labor and social legislation, on issues of instability and insecurity, on law and economics, and on institutional development and history. Clearly, a number of these courses were designed with recent New Deal social and labor legislation, and the needs of employees at the Department of Labor, in mind. Instructors such as Ezekiel and Bean were actively involved in the New Deal debates over agricultural policy and the problems of instability more generally. Ezekiel's work in and around 1938 included work on his *Industrial Stabilization Plan*, statistical work on the savings behavior of individuals, and his well-known paper on cobweb models and supply adjustment lags as a reason for instability even in agricultural markets characterized by competitive conditions (Ezekiel 1937, 1938, 1939). The significantly institutionalist nature of the economics instruction is quite obvious from the course descriptions. Somewhat in this vein there was also a lecture series, "Democracy," given in 1938, including lectures by Thurman Arnold, Walton Hamilton, Charles Beard, Ruth Benedict, and Charles Merriam, among many others.

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<sup>41</sup>Blandi was a law professor from Johns Hopkins and an expert on the history of business corporations.

<sup>42</sup>David Ziskind held a JD from Chicago and a PhD from Johns Hopkins, and was Labor Adviser to the NRA.

The late 1930s also saw the expansion of cooperation with American University into economics, and this remained a feature until 1944/45. As noted above, the Graduate School organized itself into more formal departments in 1940, and the economics course announcements began listing many courses offered by American University as well as its own. America's entry into World War II brought about a number of war-training courses in 1942, and the first organized Summer Program that included courses on price regulation and "economic warfare."

After 1940, however, things began to change in the economics offerings. Questions were asked about the Graduate School, and its legal basis, scope, and philosophy came under attack from Republican Richard N. Elliott, then Acting Controller General (Elliott 1940).<sup>43</sup> Elliott was concerned with the unclear legal standing of the school, its offering of courses that went "far beyond the strict training of employees for the better performance of their official duties," and the view of the role of government, consistent with the New Deal, to be found in many of the courses and lectures. One of the outcomes of this seems to have been a refocusing of the Graduate School offerings in economics on agricultural economics. More general courses on economics tended to become those offered by American University (for as long as that relationship lasted). For the 1940/41 year the graduate and advanced undergraduate courses in economics offered by the Graduate School itself were History of Economic Thought, Economics of International Trade, Current Foreign Trade Problems and Policies in Relation to Agriculture, Social and Economic History of American Agriculture, Production Economics, Farm Management, Principles of Agricultural Finance, Economics of Cooperative Organization, Action Programs of the Department, Principles of Land Appraisal, Principles of Insurance, Cotton Marketing, Economies of the Nations of Latin America, and History and Development of Price Policies. David Ziskind did, however, continue to teach a number of courses on labor law, the labor movement, and unemployment.

At the graduate level the school offered Economics of Consumption (Wermel), Economics of Imperfect Competition (Wermel), Forecasting Demand for Agricultural Products (Thomsen), Agricultural Price Analysis (Thomsen), and a seminar on Agriculture under Changing World Conditions (O.C. Stine). Wermel's course on imperfect competition is interesting as it includes not only Joan Robinson and Edward Chamberlin's work, but also A.R. Burn's *Decline of Competition* (1936) and Walton Hamilton and Associates' *Price and Price Policies* (1938). In subsequent years this course continued to focus on case studies of pricing in specific industries. His course on consumption is also full of the institutionalist language of planes of consumption, standards of living, consumer organization, and consumer protection. While the courses by Ziskind and Wermel continued to have an institutionalist component, the balance had shifted.

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<sup>43</sup>Elliott had been appointed Assistant Comptroller General by Hoover. On becoming Acting Comptroller General, he proved to be an obstacle to Roosevelt's programs. For his views on the Graduate School program, see Elliott (1940). The reaction at the Graduate School can be found in the binder History of the Graduate School, Volume II: 1940–1949, held by the Graduate School. Elliott's report was certainly felt to be an attack on the "New Dealish" nature of some of the school's instruction.

Ezekiel returned to economics instruction in the 1941/42 year with a one-time course on Economic Problems of the Postwar World. At that time Ezekiel was doing a substantial amount of empirical work on saving and consumption (Rutherford and DesRoches 2008), and had come to support Keynesian-style expenditure programs. His course outline speaks of giving attention to theories that bear on underutilization of resources and labor, including monopolistic competition and saving-investment equilibrium, and on statistical materials relating to the structural problems of readjustment (USDA Graduate School Records, Box 1, Bulletin of Information and Courses 1941–42, p. 18).

The change in the nature of the Graduate School offerings in economics in the early 1940s can be seen readily in Table 4, which lists the 1942/43 course offerings. As indicated, the economics program developed subsections in economics, agricultural economics, labor economics, and economic theory. In addition, numerous more standard economics courses were cross-listed with AU.

In 1943/44 two new courses began to be offered in agricultural economics: Welfare Aspects of Economic Policy by Waugh and Richard Been; and War and Post-War Food Policy by Waugh and R.H. Allen. These courses contained material relating to Waugh's own previous work on estimating the marginal utility of money, and his work on food policy, particularly in providing the theoretical rationale for the

**Table 4.** Economics Courses Offered 1942/43 (Undergraduate/Graduate and Graduate)

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Economics:
Principles and Problems of Transportation
Price Regulation
Principles of Insurance
Research Methodology in Economics
War and Postwar Financial Problems
Agricultural Economics:
Social and Economic History of American Agriculture
Production Economics
Farm Management
Current Land Policies
Agricultural Finance
Principles of Agricultural Marketing
Economic Theory:
History of Economic Thought
Economics of Imperfect Competition
Labor Economics:
Farm Labor Problems
Organized Labor and the Law
Labor and the War Program
Labor and Social Legislation
Settlement of Labor Disputes

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(Source: USDA Graduate School Records, Box 1, Catalogs 1921–1956)

food stamp plan (Fox 1989, p. 69; Waugh 1938).<sup>44</sup> Most of the other courses offered have been mentioned above, but in the economics section, a new course entitled *Econometrics: Mathematical and Statistical Analysis of Economic Problems* was introduced in the fall of 1944, taught by Been using H.T. Davis' *The Theory of Econometrics* as a text. This is the first time the term "econometrics" was used in a course description. Economic theory courses (apart from those offered by AU) were History of Economic Thought (Wasserman), Economics of Imperfect Competition (Wermel), and Post-War Economic Problems (Wermel).

The program offerings in economics continued to grow, but became increasingly specialized. In 1945/46 the economics offerings were divided between a Division of General Economics, including general economic theory, monetary and fiscal, international trade, consumption economics, labor economics, marketing, and research in social sciences; a Division of Economic and Social Policy; a Division of Agricultural Economics; and a Division of International Relations. Ezekiel taught on occasion (courses either on Reconstruction and Full Employment or on Research Methods in Social Science), as did Bean (Measurements of Economic Activity). Gardiner Means taught on Imperfect Competition and Price Regulation starting in 1946, and one can find other institutionalist elements in courses on consumption (Margaret Reid taught at the Graduate School in the late 1940s) and in other areas, but these gradually become less and less characteristic of the offerings as a whole. The courses on business fluctuations moved to become, by 1947, a course on Keynes, Hansen, Robertson, Lange, and the "Stockholm group" (USDA Graduate School Records, Box 1, Bulletin of Information and Courses 1947–48, p. 91).

From the mid-1940s, the focus on agricultural economics increased further. In 1946 the Graduate School introduced a Certified Statement of Accomplishment in Agricultural Economics, and from then on the offerings in economics, other than in agricultural economics, began to decline quite markedly. The requirements for the Certificate in Agricultural Economics are reproduced in Appendix 2. By 1950 only eleven general economics courses (three of them undergraduate) were listed, and not all of these were offered in any given year.<sup>45</sup> This significant narrowing of the offerings of the Graduate School and the increased focus on the core of agricultural economics undoubtedly reflected the political reaction against the New Dealish aspects of the instructional program mentioned above, together with more general attacks on the ideals of planning and the broader social scientific research being carried out by the BAE. The backlash against Carl Taylor's sociological survey work was particularly strong,<sup>46</sup> but there were many other lines of attack on the policy-making role of the BAE, including its proposed agricultural planning and price policies, and on what was seen as the cadre of urban liberal social scientists in the department (Kirkendall 1966). Howard Tolley resigned as chief of the BAE in 1946,

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<sup>44</sup>Banzhaf (2006) sees some of Waugh's work as anticipating more recent hedonic models.

<sup>45</sup>The current economics offerings are quite restricted and appear to be limited to the undergraduate level.

<sup>46</sup>Taylor was a graduate of Missouri (PhD 1918) and had contact with Thorstein Veblen. He taught sociological courses at the Graduate School. The sociological work he supervised included observations on the state of race relations in the South.

and others such as Ezekiel were not far behind. The BAE was eventually abolished in 1953.

## V. CONCLUDING REMARKS

The USDA Graduate School clearly was a remarkable organization, and its contributions go far beyond anything discussed here. It began very small with only a few courses, but underwent a massive expansion in the mid- to late 1930s, becoming a unique entity within the federal civil service. The education provided by the school over the period considered here was genuinely at the graduate level. Most studies of the government use of expertise deal with the provision of advice from individuals employed in outside think tanks or research institutions, or who were, at least, trained in the university system. Here we have a case of a government department providing graduate-level training itself, initially for its own employees but ultimately for employees across the civil service. That this occurred in the way it did undoubtedly had something to do with the fact that even prior to the New Deal, the BAE and the Department of Agriculture generally were more aligned to interventionist policies than other departments (for example, Commerce), and were already in the business of training their own people in the statistical and other tools necessary for the implementation of such policies (Hawley 1990). The close association of the USDA, the BAE, and the Graduate School with New Deal efforts at planning, however, left them open to attacks from political opponents and business interests, attacks that became increasingly important after 1940.

In terms of statistics, the instruction was often highly advanced, although clearly also applied in orientation. That the school could provide regular instruction by individuals such as Tolley, Ezekiel, Deming, and Frankel, as well as special lectures from R.A. Fisher and Neyman, is historically significant. This level of instruction, available to economists and others in the USDA and elsewhere in the federal government, must have had much to do both with the statistical expertise shown by many of the agricultural economists of the time, and with what Duncan and Shelton (1978) have called the revolution in government statistics that occurred in the 1930s and 1940s. This is perhaps most obvious in the areas of price measures, unemployment measurement, and in the census. It is often forgotten how much was done in statistical research, particularly in applied areas, by statisticians and economists in government employ, working largely outside (although in contact with) the academic world (see also Duncan and Shelton 1992). Deming had a particularly important role here due to his previous contacts with both Fisher and Neyman. By the early 1940s the Graduate School was offering an array of statistics courses that many university departments would have been hard pressed to match. The training in sampling, in particular, would have been well in advance of that offered at most universities.

An important observation about the Graduate School is that its statistical sophistication was not wedded to the use of well-specified neoclassical or Keynesian models. Moreover, the important work on sampling, which became such a notable feature of the Graduate School instruction in statistics in 1940, came in good part out of the policy concerns of the New Deal and the related survey work on

unemployment and household expenditure conducted by people such as Stock, Frankel, Friedman, Wilcox, and others. This work was underway even before the widespread adoption of Keynesian ideas, and had more to do with the policy concerns and research agenda of the New Deal “planners,” such as Ezekiel and Gardiner Means, than anything else (Stapleford 2007). The close linking of econometrics to structural economic models that was to become such a feature of the work done at Cowles was not a dominant aspect of the work done at USDA, or of the teaching provided by the Graduate School.

It is difficult to find out who received statistical training from the Graduate School as the archives do not contain lists of students, but Leslie Kish has spoken of the importance of his experiences at the USDA Graduate School in his own development. On Deming he mentions his “unusual ability to get hold of somebody’s important idea and develop it,” particularly in the case of Neyman. Deming invited Neyman to give “his famous lectures at the USDA” and Deming “adopted his philosophy” (Frankel and King 1996, p. 71). It is interesting to note Friedman’s participation in USDA conferences, his involvement with survey work on consumption, and his teaching at the Graduate School. Friedman’s later well-known opposition to the approach of those at Cowles would be in line with the attitudes of others at the school.

In terms of economics, the teaching at the school follows an interesting trajectory. Initially, the economics instruction was limited in quantity and confined very largely to agricultural economics. This period was then followed by one in which the primary courses were the Ezekiel/Bean courses on price and price relationships. These courses went beyond agricultural prices only, were concerned with the general problem of business cycles, and were closely linked up with the instruction in statistics. The courses by Ezekiel and Bean are notable for their very extensive empirical content. In this attribute, they suggest comparisons with Wesley Mitchell’s business cycle course at Columbia or F.C. Mills’ work on both prices and statistics, again at Columbia (Rutherford 2004). What is especially interesting about Ezekiel and Bean is that they were teaching in both economics and statistics, and that there was very clearly an intimate link between their empirical economic work and their work in statistical methods. In the case of Ezekiel especially we have a case of someone who was in the institutionalist mold, a proponent of economic planning, and who was making contributions both to empirical economics and to applied regression analysis. In this manner, advanced statistical technique coexisted with institutionalist sensibilities. It is true that the work by E.J. Working and, later, Waugh was aligned to neoclassical concepts in demand theory, but Ezekiel and Bean taught regularly in both the statistics and economics programs, something that indicates that the statistical training they offered was felt to be quite consistent with institutionalist economic ideas.

The course offerings in economics then expanded greatly both in number and in breadth in the mid- to late 1930s, clearly in connection with the New Deal. What is especially interesting about this phase of the school’s instruction in economics is how much of it had relatively little to do with agricultural economics as narrowly defined, and the significant part of it that embodied the institutionalist concerns of institutional change and social control. That the USDA Graduate School would offer courses on the history of economic thought, and the evolution of economic institutions, tells one something about the philosophy of those heading up the program (Jewett 2011). The

scope of the courses offered and their nature reflected more than just the immediate needs of government agencies as created by New Deal legislation. Of course, neoclassical theoretical ideas were by no means absent from the instruction at the school in the 1930s, but there was a clear and substantial institutionalist component, a component that would have been entirely consistent with the favorable attitudes to “social control” then being expressed in government policy.

The economics course offered by the school itself, even at their peak, never amounted to as much of a self-contained graduate program as did the statistics offerings, but together with the courses cross-listed from AU, the Graduate School was certainly offering the equivalent of a good-quality PhD program. To be sure, the Graduate School itself never offered the equivalent of the PhD-level courses in theory as found in schools such as Harvard and Chicago, but it should be remembered that neither Columbia nor Wisconsin offered much in the way of theory instruction until after World War II (Rutherford 2004, 2006). The Graduate School’s own courses were certainly up to date, if not as leading edge as some of those in statistics. One very interesting exception to this, however, was Ezekiel’s attempt to offer a mathematical economics course in 1932. At this time such a course would have been very unusual indeed, and to see it being offered by someone of institutionalist background provides a counterexample to the usual view of institutional economists as opposed to more formal mathematical methods.<sup>47</sup>

The broader institutionalist component died out of the school’s offerings over the course of the 1940s. Institutionalism was also in retreat in the universities at the same time, but in the case of the main centers of institutionalism, Columbia and Wisconsin, this was largely a matter of the arrival of Keynesian economics and new techniques more aligned to neoclassical approaches. In the case of the USDA Graduate School, what is observed is not a substitution of instruction in these new areas for the more institutionally orientated courses, but a narrowing of the instructional program back towards a focus on agricultural economics, and more in line with the core responsibilities of the USDA. In this case the shift in emphasis seems to have been primarily from the growth of political and business opposition to the previous focus on planning and the relatively statist approach to economic policy matters both in agriculture and beyond. This shift in the economics training provided by the Graduate School undoubtedly played a part in the overall decline of institutional approaches within the federal civil service and the economics profession more generally.

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<sup>47</sup>This is not the only such example. Morris Copeland also engaged in some mathematical modeling.

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**Appendix 1. Courses Leading to Certified Statement of Accomplishment in Statistics**

*With Concentration in One of the Following Fields of Accomplishment*

PROCESSING OF DATA	SOCIAL SCIENCES	BIOLOGICAL AND PHYSICAL SCIENCES	DESIGN AND INTERPRE-TATION OF SAMPLING SURVEYS
<i>BASIC COURSES—Required of all candidates</i>			
L-2-2. Algebra for Statistics <i>A.. George Carlton</i>	L-2-2. Algebra for Statistics <i>A.. George Carlton</i>	L-2-2. Algebra for Statistics <i>A.. George Carlton</i>	L-2-2. Algebra for Statistics <i>A.. George Carlton</i>
L-2. Graphic Methods for Presenting Statistical Data <i>R. G. Hainsworth</i>	L-2. Trigonometry and Geometry for Statistics <i>A. George Carlton</i>	L-2. Trigonometry and Geometry for Statistics <i>A. George Carlton</i>	L-2. Trigonometry and Geometry for Statistics <i>A. George Carlton</i>
L-2-2. Introduction to Statistical Analysis <i>Drs. Solomon Kullback, Benjamin Tepping; Messrs. C. M. Purves, Sidney Wilcox, Joseph Steinberg</i>	L-2-2. Introduction to Statistical Analysis <i>Drs. Solomon Kullback, Benjamin Tepping; Messrs. C. M. Purves, Sidney Wilcox, Joseph Steinberg</i>	L-2 or 3. Introduction to Experimental Design <i>Dr. Otis A. Pope</i> or L-2-2. Introduction to Statistical Analysis <i>Drs. Solomon Kullback, Benjamin Tepping; Messrs. C. M. Purves, Sidney Wilcox, Joseph Steinberg</i>	L-2-2. Introduction to Statistical Analysis <i>Drs. Solomon Kullback, Benjamin Tepping; Messrs. C. M. Purves, Sidney Wilcox, Joseph Steinberg</i>
<i>SPECIALIZED COURSES—24 credits, selected from appropriate field of application, required of all candidates</i>			
U-2. Machine Tabulation <i>Milton Kaufman</i>	I-3-3. Calculus <i>Dr. E. J. Finan</i>	I-3-3. Calculus <i>Dr. E. J. Finan</i>	I-3-3. Calculus <i>Dr. E. J. Finan</i>
U-2. Advanced Study of Tabulating Equipment <i>Milton Kaufman</i>	G-2-2. Interpretation of Statistical Calculations <i>Alexander Sturges</i>	G-2 or 3. Design and Analysis of Complex Experiments <i>Dr. A. E. Brandt</i>	G-2 or 3. Design and Analysis of Complex Experiments <i>Dr. A. E. Brandt</i>
G-2. Planning of Statistical Inquiries <i>Dr. Philip M. Hauser</i>	G-2. Planning of Statistical Inquiries <i>Dr. Philip M. Hauser</i>	G-3. Quality Control <i>Dr. W. Edwards Deming</i>	G-2-2. Theory of Functions <i>Dr. C. Winston</i>
G-2. Office Procedures and Estimates <i>Dr. Philip M. Hauser</i>	G-2. Office Procedures and Estimates <i>Dr. Philip M. Hauser</i>	G-2-2. Interpretation of Statistical Calculations <i>Alexander Sturges</i>	G-3-3. Statistical Inference <i>Dr. W. Edwards Deming</i>

GU-2-2. Selected Statistical Problems <i>Dr. John M. Smith</i>	G-2. Sampling in Social and Economic Surveys <i>J. Stevens Stock and Lester R. Frankel</i> or G-2. Theory of Sampling <i>Jerome Cornfield and W. D. Evans</i>	G-3. Interpolation <i>Dr. W. Edwards Deming</i> or G-2. Statistics of Crop Estimation <i>Dr. A. E. Brandt</i>	G-2-2. Theory of Sample Surveys <i>Drs. William Madow and William Hurwitz</i> G-2. Linear Algebra <i>M. A. Girshick</i>
G-2-2. Interpretation of Statistical Calculations <i>Alexander Sturges</i>	G-2-2. Population Statistics <i>Dr. Philip M. Hauser</i> or G-2-2. Statistical Analysis of Economic and Social Problems <i>Milton Friedman</i> or G-2-2. Statistics of Agricultural Economics <i>Dr. F. V. Waugh</i>	G-3-3. Statistical Inference <i>Dr. W. Edwards Deming</i>	
G-2-2. Population Statistics <i>Dr. Philip M. Hauser</i>	G-2-2. Psychological and Educational Statistics	G-2-2. Statistical Methods for Research Workers <i>Dr. William G. Madow</i> G-3. Least Squares and Curve Fitting <i>Dr. W. Edwards Deming</i>	G-2-2. Multivariate Analysis <i>M. A. Girshick</i> G-2. Analysis of Variance <i>M. A. Girshick</i> G-2-2. Modern Statistical Theories <i>Dr. Joseph Daly</i>

ELECTIVE COURSES

- U-3. Higher Algebra—*Dr. E. J. Finan* (may be substituted for Linear Algebra as a prerequisite for Multivariate Analysis)  
 U-2. Coordinate Geometry and Vectors—*Dr. Sebastian Littauer*  
 U-1. Nomograms—*Eugene Rasor*  
 GU-2-2. Advanced Calculus  
 G-2-2. Differential Equations  
 G-2-2. Theory of Infinite Processes—*Dr. C. Winston*  
 G-1. Interpolation, Approximation, and Quadrature—*Dr. J. Shohat*  
 G-2-2. Theory and Application of the Characteristic Function—*Dr. Solomon Kullback*

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(Courses labeled U are undergraduate, G are Graduate)  
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**Appendix 2.** Courses Leading to Certified Statement of Accomplishment in Agricultural Economics

*(With Concentration in Specified Fields of Application)*

Economics of Production

Agricultural Finance

Prices and Marketing

**BASIC UNDERGRADUATE COURSES**

Required foundation courses. Carry undergraduate credit only and may not be used to meet the credit hour requirement for the certified statement. Equivalent courses will be accepted by transcript from other institutions.

The number in parenthesis after course title indicates semester hour credits.

Principles of Economics (6)

Principles of Economics (6)

Principles of Economics (6)

Elementary Statistical

Elementary Statistical Analysis (4)

Elementary Statistical Analysis (4)

Analysis (4)

Economics of Farm Production (3)

Economics of Farm Production (3)

Economics of Farm Production (3)

Economics of Marketing (3)

Economics of Marketing (3)

Economics of Marketing (3)

**REQUIRED BASIC GRADUATE COURSES**

Imperfect Competition and

Imperfect Competition

Imperfect Competition and

Public Regulation (6)

and Public Regulation (6)

Public Regulation (6)

Monetary and Employment Theories (6)

Monetary and Employment Theories (6)

Monetary and Employment  
Theories (6)

**REQUIRED SPECIALIZED GRADUATE COURSES**

Farm Management (4) or

Agricultural Finance (3)

Market Organization for Production  
of Marketing Services (3)

Land Economics (4)

Seminar in Agricultural Price and

Farm Management (4) or

Market Structure and Price

Income Policy (3)

Land Economics (4)

Determination (3)

Seminar in Agricultural Price and

Income Policy (3)

Seminar in Economics of Production (3)

Seminar in Agricultural Finance (3)

Seminar in Marketing (3)

**ELECTIVE GRADUATE COURSES**

Select courses in consultation with Graduate School advisers to complete the 30 graduate credits required for certified statement of accomplishment.