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# CHAPTER 2

## The Course of Money Wages during 1860-1890

### *Daily Wages in Manufacturing and Building*

The average daily wage made an estimated net over-all advance between 1860 and 1890 of roughly 50 percent for manufacturing and 60 percent for building trades workers (Tables 1 and 2). We have some confidence in these estimates, at least in the one for manufacturing which rests on three independent estimates from four sets of basic data: the Weeks and the Bulletin 18 data, which combine to form one estimate; the Aldrich data; and the census decennial average annual earnings. Still, it would be well to disclaim any precision for these materials. The Weeks Report ends in 1880, covers only manufacturing, and has sparse representation from the South. The Bulletin 18 Report begins in 1870, and provides wage data for mainly skilled occupations in large cities—only two of them southern. The Aldrich Report gives no wages for the South and West. And the censuses, though they undertake to cover all manufacturing for the whole nation, report only decennial years and annual earnings, which can be compared with daily wages only under comparable employment conditions. All the estimates refer to manual workers.

The 50 percent increase for daily wages in manufacturing is supported by all three independent estimates: The Aldrich data yield a rise over the thirty years of 48 percent. The Weeks and Bulletin 18 data, in combination, yield a rise of 50 percent (the former indicating a rise of 34 percent from 1860 to 1880 and the latter 12 percent from 1880 to 1890. And the average annual earnings in manufacturing, derived from the decennial censuses and described in Chapter 3, yield a 44 percent rise for all manufacturing and 49 percent for 17 industries that come closest to comparability with those in the Weeks and Aldrich Reports. These increases are a fifth less than those found by Mitchell and Falkner from weighted means of Aldrich data.[1]

The advance of approximately 60 percent for building trades daily wages was, by necessity, derived almost entirely from Aldrich data. These data are confined to the eastern states, but they cover the entire thirty years. The Weeks Report contains no information on building, and the Bulletin 18 data cover only four skilled building occupations

[1] Falkner obtained an increase of nearly 60 percent in his simple mean and nearly 70 percent in his weighted mean. Mitchell obtained an increase of close to 60 percent in both his simple and weighted means, but only 53 percent in his weighted median.

TABLE 1

Money Average Daily Wages in Manufacturing Industries, Based on Aldrich, Weeks, and Bulletin 18 Reports, Compared with Census-Reported Average Annual Earnings in Manufacturing: 1860-1890

| Year | Aldrich Report | Weeks Report | Bulletin 18 | Weeks–Bulletin 18 | Census: Average Annual Earnings: All manufactures | Census: Average Annual Earnings: 17 Industries[a] |
|---|---|---|---|---|---|---|
| | | | CURRENT DOLLARS | | | |
| 1860 | 1.19 | 1.32 | | | 297 | 277 |
| 1865 | 1.64 | 1.82 | | | | |
| 1870 | 1.79 | 1.92 | 2.05 | | 384 | 363 |
| 1875 | 1.72 | 1.84 | 1.93 | | | |
| 1880 | 1.54 | 1.77 | 1.72 | | 345 | 325 |
| 1885 | 1.61 | | 1.87 | | | |
| 1890 | 1.75 | | 1.93 | | 427 | 412 |
| | | | RELATIVES: 1860 = 100 | | | |
| 1860 | 100 | 100 | | 100 | 100 | 100 |
| 1865 | 138 | 138 | | 138 | | |
| 1870 | 151 | 146 | | 146 | 129 | 131 |
| 1875 | 145 | 139 | | 139 | | |
| 1880 | 130 | 134 | | 134 | 116 | 117 |
| 1885 | 136 | | | 146 | | |
| 1890 | 148 | | | 150 | 144 | 149 |
| | | | PERCENTAGE CHANGES | | | |
| 1860-1880 | +30 | +34 | | +34 | +16 | +17 |
| 1880-1890 | +14 | | +12 | +12 | +24 | +27 |
| 1860-1890 | +48 | | | +50 | +44 | +49 |

Source and explanation: Text of Chapter 2; Appendix Tables A-1, A-3, A-4, A-9.
[a] Adjusted to exclude, in 1890, earnings of officers, firm members, and clerks, and in all census years, the following: wage earners in hand trades; two industries, boots and shoes and men's clothing, dominated by custom and repair shops; nonmanufacturing industries; and intermittently reported manufacturing industries. For detailed listing of the excluded earnings, see Table 14; for a listing of the 17 industries, Appendix Table C-2.

beginning in 1870. Unlike our results for manufacturing, the building wages from these two sources were not in close agreement, the Aldrich data showing a larger net decline between 1870 and 1890 and fluctuating more in the 1870's and 1880's. Again, our rise for the thirty years was about one-sixth smaller than that found by Mitchell—apparently because of our using census-reported employment weights for different states and our averaging dollar instead of relative wages.

TABLE 2

Money Average Daily Wages in the Building Trades, Aldrich and Bulletin 18 Reports, 1860-1890

| Year | *Aldrich Report* | *Bulletin* 18 | *Census: Average Annual Earnings, Construction* |
|---|---|---|---|
| | CURRENT DOLLARS | | |
| 1860 | 1.69 | | 412 |
| 1865 | 2.55 | | |
| 1870 | 3.06 | 2.97 | 423 |
| 1875 | 2.69 | 2.78 | |
| 1880 | 2.14 | 2.55 | 453 |
| 1885 | 2.56 | 2.89 | |
| 1890 | 2.68 | 2.94 | 620 |
| | RELATIVES: 1860 = 100 | | |
| 1860 | 100 | | 100 |
| 1865 | 151 | | |
| 1870 | 181 | | 103 |
| 1875 | 159 | | |
| 1880 | 127 | | 110 |
| 1885 | 151 | | |
| 1890 | 159 | | 151 |
| | PERCENTAGE CHANGES | | |
| 1860-1880 | +27 | | +10 |
| 1880-1890 | +25 | +15 | +37 |
| 1860-1890 | +59 | | +51 |

Source and explanation: Text of Chapter 2; Table 14; Appendix Tables A-1 and A-4.

## *The Method Used in This Study*

Our investigation of wages differs from others of this period in a number of features. First, the use of dollar wages enables us to study the absolute wage level, the absolute variations in wages over time, and the structure of wages among different occupations, industries, regions, or type of worker at a given time. Other investigators have studied only the relative changes in wages, and only changes in the relationship compared to the base date.

Second, our analysis is confined to manufacturing and building industries, and eliminates railroads, sidewalks, city public works, dry goods, and grocery stores. Moreover, it keeps building trades separate from manufacturing.

Third, it relies mainly on those firms, industries, and occupations

with wage data covering the entire period 1860-80 or 1860-90, and excludes data beginning after 1860 or having substantial gaps during 1860-90. This means that our average wages based on the Aldrich Report were for only 49 firms in manufacturing and 21 in building, instead of a somewhat larger number, and that our average based on the Weeks Report was for only 69 firms instead of over 200 firms with more or less continuous data that begin after 1860, and more than 600 for which some wage information has been issued.

Fourth, the wage averages in this study are weighted averages, based at the establishment level on the number of persons employed at the various wage rates, and at the state and industry levels on the number of persons that the decennial censuses reported as gainfully occupied. The averages for the Aldrich and Weeks data were computed in five steps:

*Step one.* Establishments were classified by industry and state, e.g., cotton goods in Massachusetts.

*Step two.* An average wage was computed for each establishment from the wages for each occupation. For the Aldrich data, the occupational wage rates could be weighted by the number employed in that occupation. For the Weeks data, the lack of necessary employment information obliged us to compute an unweighted average of these occupational wage rates within a firm.

*Step three.* An average wage was computed for each industry in each state for which wage data were available. For the Aldrich data, the average wage of each establishment could be weighted by its employment, to arrive at a weighted average wage for all the establishments in the industry in that state. For the Weeks data, the state-industry average could not be weighted, owing to the lack of employment data for the firms. Where there was only one firm, its wages data had to represent the industry in the state and in the nation.

*Step four.* For both Aldrich and Weeks data the state wage for each industry was weighted by the number gainfully occupied in that industry in that state, using decennial census data for 1860, 1870, 1880, and 1890, and linear interpolations between censuses. The result was the weighted average wage for an industry, covering all the states in which that industry was reported. Separate averages were computed for eastern states, western states, and southern states.

*Step five.* The wage for each industry was combined into the wage for all manufacturing industries. This was done for the Aldrich Report by means of weighting by the gainfully occupied in each of its industries, to obtain national and regional weighted average

wages for all the 13 industries in that report. The same was done for the 18 industries of the Weeks Report.

Bulletin 18 did not report on an establishment or industry basis; rather, it reported on only 14 occupations. Four of these—bricklayers and masons, carpenters and joiners, house painters, and plumbers—were of the kind found in the building trades and were therefore averaged to obtain a so-called national wage for building, despite the fact that some persons in these occupations are also employed in most manufacturing industries. The remaining ten—blacksmiths, boilermakers, cabinetmakers, compositors, iron-molders, laborers (nonstreet), machinists, patternmakers, stonecutters, and teamsters—might be called manufacturing occupations, though many of them are also found in industries like transportation, construction, or repair service. Since Bulletin 18 did not furnish employment data, the occupations were weighted by the number gainfully occupied at the decennial census in the states in which the cities reported on in the bulletin were located.

## *Methods Used by Others*

Almost every analyst of these materials has resorted to a different system for combining the relative wage rates of the various occupations into an average for the industry and the nation. The principal analysts have been Roland P. Falkner, Wesley C. Mitchell, Alvin Hansen, and E. H. Phelps Brown with Sheila V. Hopkins.

Falkner, who wrote the Aldrich analysis, used two kinds of averages. One was a simple average of relatives, with each occupational series having equal weight within the industry, regardless of wage and number of employees, and each industry also having equal weight, regardless of the number of firms and employees in the industry. The other was a weighted average, constructed in the same way up to the industry level, but differing in that the average wage of each industry was weighted by the number of persons attached to that industry at the decennial population censuses.[2]

Mitchell criticized the weighting methods employed by Falkner

[2] Aldrich Report, Part 1, p. 176. Falkner reduced the number of industry groupings from 22 to 17, sidewalks and spices not having been important enough for separate classifications, gingham having been included under cotton mills, and dry goods and groceries having been combined under the census term dry goods (stores). Since census designations did not always cover exactly the categories for which wage data were reported, Falkner let white lead stand for chemical manufactures, and city public works for government. He used the census number of gainful workers (say for 1860) for the first five years of the decade (say 1860-64), and used the average of the numbers reported at the two censuses (say 1860 and 1870) for the last five years of the decade (say 1865-69). Since the 1890 census had not yet been tabulated, Falkner used the 1880 data for the period 1880-90.

as "so faulty that I have thought it necessary to do the whole work over again."[3] His chief criticism of Falkner's averages was that —weighted or unweighted on the national level—they both rested within an industry on simple averages of the relative wages of the different occupational series. Instead, Mitchell constructed two sets of averages.[4] One set for the Aldrich data consisted of means—weighted and simple. His weighted mean was constructed by multiplying each relative wage quotation by the number of employees receiving that wage, summing the products, and dividing by the number of employees.

His second set consisted of medians—again simple and weighted. The simple median was constructed by ranking the relative wage quotations at any given time from lowest to highest, without regard to number of employees receiving them, then choosing the middle-most wage as median. This method, for lack of employment data, was the sole one applied to the Weeks data. His weighted median was constructed from the Aldrich data by ranking the relative wage quotations at any given month from lowest to highest alongside the number of employees receiving them and then choosing the wage quotation as median which belonged to the middle-most worker. At the same time he also constructed the deciles. Mitchell confined his analysis of Aldrich data to the median weighted by employment.

Hansen's study was part of a "long-run view of the course of real wages" for the period 1820-1923. He used two indexes of *money* wages for this period. Curve A was constructed by joining (1) Mitchell's weighted average daily wage index for the period 1860-80 (which he described as more scientifically constructed than Falkner's index), and (2) Falkner's unweighted index for 1880-90. Curve B was an average of the index numbers of the weekly wages of laborers and artisans compiled by the Russell Sage Foundation from "governmental" sources, including the Massachusetts, Weeks, and Aldrich (Falkner) Reports, and Bulletin 18 of the Bureau of Labor Statistics.[5] Hansen did not describe the data further, and he made no analysis of money wages, proceeding immediately to his adjustment for price level changes and his discussion of real wage behavior.

In a recent, comparative study of wage rates in a number of countries, E. H. Phelps Brown and Sheila V. Hopkins also relied upon the Aldrich materials for the American experience during

[3] Wesley C. Mitchell, *Gold, Prices, and Wages under the Greenback Standard*, p. 92.
[4] Mitchell's entire analysis was of wages expressed in relatives of 1860.
[5] Alvin H. Hansen, "Factors Affecting the Trend of Real Wages," *American Economic Review*, Vol. xv, 1925, p. 27. The B series he obtained directly from Ralph G. Hurlin.

1860-89, and have put together an index which combines, with modifications, the methods of Mitchell and Falkner. They followed Mitchell in weighting the wages of the occupations by the number of employees receiving these wages in order to obtain the weighted average for the industry, but deviated in using the average employment for 1870-79 rather than for each individual date. They followed Falkner in using as weights the total numbers occupied in the several industries, but again deviated in using as constant weights throughout the number of persons occupied in the several industries in 1870.[6]

## *Comparison of Average Wages Obtained in This and Other Investigations Using Aldrich Data*

Relative wages obtained by this and other investigations from the Aldrich data are compared for quinquennial dates in Table 3. Several features are worth noting.[7]

There was very little difference in relative change between the mean and the median—whether Mitchell's simple mean is compared with his simple median or his weighted mean with his weighted median. The median is laborious to compute and, though free of the randomness that derives from the influence of extreme values, is subject to the randomness that derives from gaps in the distribution of the values in a smaller number of observations. Since wage data of manual workers are free of really extreme values, it seemed easier, and at least as safe, to use the mean.

It did make a difference whether the average was weighted or unweighted by employment. Mitchell's weighted mean rose substantially more than his unweighted mean during and after the Civil War, stood relatively about 10 percent higher in 1870, then fell proportionately more to 1875. The same may be said for the comparison of weighted and unweighted medians. However, the over-all advance between 1860 and 1880 or 1891 was much the same whether the relative wages were weighted or unweighted. Falkner's weighted means also advanced more than his unweighted means during and after the Civil War. This difference had disappeared by 1875 and 1880, but it reappeared during the 1880's, making the net advance between 1860 and 1890 greater for his weighted average. The reason

[6] E. H. Phelps Brown with Sheila V. Hopkins, "The Course of Wage-Rates in Five Countries, 1860-1939," *Oxford Economic Papers*, New Series Vol. 2, June 1950, pp. 267-269.

[7] The averages presented by Hansen do not merit separate comment, since they were derived by merely splicing the indexes of Mitchell for 1860-80 and of Falkner for 1880-90. The average presented by Phelps Brown and Hopkins, since their chief distinction of method was in using fixed instead of variable weights, will be discussed in a later chapter in connection with that question.

TABLE 3

Relatives of Average Daily Wage-Rates, Computed from the Aldrich Report in This and Other Investigations: 1860-1890
(Basic Data, Average of January and July; 1860 = 100)

| | *This Study* | *Falkner* | | *Mitchell 21 Industries* | | | | *Hansen* | |
|---|---|---|---|---|---|---|---|---|---|
| | 13 *Manufacturing Industries, Weighted Mean*[a] (1) | 21 *Industries, Simple Mean*[a] (2) | 17 *Industries, Weighted Mean*[a] (3) | *Simple Mean*[a] (4) | *Weighted Mean*[a] (5) | *Simple Median*[a] (6) | *Weighted Median*[a] (7) | *Series A* (8) | *Phelps Brown* (9) |
| 1860 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1865 | 138 | 143 | 149 | 144 | 154 | 144 | 151 | 153 | 158 |
| 1870 | 151 | 162 | 167 | 162 | 180 | 162 | 180 | 179 | 182 |
| 1875 | 145 | 158 | 158 | 158 | 165 | 158 | 163 | 164 | 170 |
| 1880 | 130 | 142 | 143 | 143 | 143 | 138 | 139 | 140 | 151 |
| 1885 | 136 | 151 | 156 | n.c. | n.c. | n.c. | n.c. | 149 | 170 |
| 1890 | 148 | 159 | 168 | 161[b] | 158[b] | n.c. | 153[b] | 157 | 174 |

n.c. Not computed.

Source: Table 2, above; Falkner, Aldrich Report, Vol. 3, Part 1, pp. 173-176; Wesley C. Mitchell, *Gold, Prices, and Wages under the Greenback Standard*, pp. 105-118, 120, 169-170, 173-174, 204-206; Alvin H. Hansen, "Factors Affecting the Trend of Real Wages," *American Economic Review*, Vol. xv (1925), p. 32; E. H. Phelps Brown with Sheila V. Hopkins, "The Course of Wage-Rates in Five Countries, 1860-1939," *Oxford Economic Papers*, New Series, Vol. 2, June 1950, p. 277.

[a] Computed from occupational wage quotations, not from wages of individual persons.

[b] January 1891.

for this greater fluctuation of the average, Mitchell felt, was that the more widely fluctuating wages were those of the relatively numerous unskilled and semiskilled workers and that the larger establishments had a stronger tendency than the smaller firms to advance wages more rapidly during the general rise and reduce them more sharply during the general fall.[8]

Third, Mitchell's weighted mean fluctuated more widely than Falkner's, rising relatively more during and after the Civil War and falling relatively more during the 1870's, but it lost ground during the 1880's and realized a smaller net advance between 1860 and 1890. In commenting on these differences, Mitchell remarked that Falkner, in his method of weighting the wages of the 17 industries by the census returns for the numbers gainfully occupied in these industries, "kept his old errors of method, and added new ones to them."[9] This was because the Falkner method retained the faulty technique

[8] Mitchell, *Gold, Prices, and Wages*, p. 171-172.

[9] *Loc.cit.* Before making his comparison, Mitchell recomputed Falkner's simple or unweighted average (in order to make sure that the disparity of movement was not caused by Mitchell's omission of a few series which Falkner used), made separate series for males and females in occupations in which both sexes are employed, and computed relative wages always on the basis July 1860 = 100.

of arriving at the average for each industry by giving each occupational series equal weight, and numbers reported gainfully occupied by the census "do not give weights properly applicable to industries." We shall say something about these "errors" presently, since they bear on the accuracy of the method of weighting used in this study.

Fourth, the weighted averages of wages derived in this study for the 13 manufacturing industries and for building (Tables 3 and 4) differ somewhat from the averages obtained in all the other investigations—showing less fluctuation during the 1860's and 1870's and less net advance between 1860 and 1880 or 1890.

What is the explanation of this smaller fluctuation and advance? In the case of manufacturing, about two-thirds of the disparity seems to be due to my use of census-reported, instead of Aldrich-reported, employment weights for averaging the wage rates of firms in different states and for computing the wages of different industries (Table 5, line 5). This is brought out most clearly in that Falkner's weighted mean which relied on census-reported employment, was substantially lower in 1865, 1870, and 1875 and therefore closer to my averages than Mitchell's weighted mean which used Aldrich-reported employment. On the other hand, Falkner's index was substantially higher than Mitchell's index in 1890 and therefore not so close to my average in that year. Mitchell, as we have seen, felt that the Falkner method was in error, but after all, the purpose of the average should be to give most weight to industries that employ the most workers in the nation as a whole and not to the ones that happened, through accident of selection and reporting, to be the largest employers in the Aldrich sample.[10] Mitchell is on firm ground in stating that census weights give excessive importance to some industries for which his data were too scanty to give reliable averages. However, his chief examples of this were dry goods (stores) and railroads, which we exclude from our average of wages in the 13 manufacturing industry average.

Much of the remaining difference is provided by the exclusion of nonmanufacturing industries; of these, public works, railroads, and building have much the most of the weight (Table 5, line 4). The final source of measurable difference is in computing my average from dollar rather than relative wages. The effect was tested by comparing for 13 individual industries my index computed from dollar wages with Mitchell's computed from relative wages. On the whole the effect was very small (see Table 5, line 6).

[10] Albert Rees is in disagreement with me on this method of weights. However, he suggests that he is willing to yield the point if the census annual earnings data should turn out to move more closely with my daily wage data than with those of Mitchell as between decennial dates 1860-90. This proves to be the case (Table 15).

TABLE 4

Relatives of Average Daily Wage-Rates in the Building Trades; Computed from the Aldrich Report in This and Other Investigations: 1860-1890
(Basic Data, Averages of January and July; 1860 = 100)

| | *This Study* | *Falkner* | *Mitchell* | |
|---|---|---|---|---|
| | *Weighted Mean* | *Simple Mean* | *Weighted Mean* | *Weighted Median* |
| 1860 | 100 | 100 | 100 | 100 |
| 1865 | 151 | 161 | 150 | 148 |
| 1870 | 181 | 186 | 188 | 182 |
| 1875 | 159 | 169 | 167 | 168 |
| 1880 | 127 | 143 | 141 | 144 |
| 1885 | 151 | 170 | n.c. | – |
| 1890 | 159 | 173 | 169 | 175 |

Source: See Table 3.

TABLE 5

Factors Explaining the Discrepancy in Relative Behavior between the Weighted Mean of Dollar Wage-Rates in Manufacturing Derived in This Study from the Aldrich Report, and the Weighted Mean of Relative Wage-Rates, Derived from It by Wesley Mitchell for the Manufacturing Industries along with Others: 1860-1890
(Basic Data, Averages of January and July; 1860 = 100)

| | *1860* | *1865* | *1870* | *1875* | *1880* | *1885* | *1890* |
|---|---|---|---|---|---|---|---|
| 1. Mitchell: 21 industries[a] | 100 | 154 | 180 | 165 | 143 | n.c. | 158[b] |
| 2. This study: 13 manufacturing industries | 100 | 138 | 151 | 145 | 130 | 136 | 148 |
| 3. Excess of line 1 over line 2 | – | 16 | 29 | 20 | 13 | – | 10 |
| Estimated discrepancy due to fact that this study: | | | | | | | |
| 4. Excludes city public works, railroads, building[c] | – | 4 | 10 | 4 | 0 | – | 1 |
| 5. Uses census- instead of Aldrich-employment weights on industry and state levels[d] | – | 14 | 20 | 10 | 8 | – | 9 |
| 6. Computes dollar averages before converting to relatives[e] | – | −1 | 1 | 1 | 3 | – | 0 |
| 7. Sum of lines 4-6 | – | 17 | 31 | 15 | 11 | – | 10 |
| 8. Remaining discrepancy[f] (line 3 minus line 7) | – | −1 | −2 | 5 | 2 | – | 0 |

n.c. Not computed by Mitchell.

Source and explanation: Mitchell, *Gold, Prices, and Wages*, pp. 94, 95, 120, 173; this study, Appendix Table A-1, and text of this chapter. (Notes continue on p. 23.)

In the case of building wages, however, the reason for most of the excess of Mitchell's index over mine is that his was computed from relative wages whereas mine was computed from dollar wages. My use of census-reported employment in weighting occupational wages on the state level was accountable for only a minor part of the difference. (Table 6.)

In sum, the smaller rise in my averages of manufacturing and building wages between 1860 and 1870, or between 1860 and 1890, has been due almost entirely to three factors: First, dollar wages give more weight to high-wage occupations in which wages typically advanced relatively less during this period. Second, census-reported weights happen to give greater weight to certain industries whose average wages showed smaller advance. Third, the 13-industry average excludes certain nonmanufacturing industries whose wages rose substantially more than those in manufacturing. If these differences in method are justifiable, the restrained fluctuation and smaller over-all advance of my wage-averages represent more accurately the true wage behavior of this period.

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[a] The industries include—besides manufacturing—railroads, building, dry goods, and others.

[b] January 1891.

[c] Line 4 was computed as the difference between Mitchell's index of relative wages with and without building, city public works, and railroads.

[d] Line 5 was computed by subtracting for each quinquennial year my 13-industry average of wages weighted by census-reported employment in each industry, from a 13-industry average of wages weighted by Aldrich-reported employment in each industry.

[e] Line 6 was computed by: (a) taking the difference in each of the 13 industries for quinquennial years between my weighted average wage, derived by averaging dollar wages in the various occupations, and Mitchell's weighted average wage derived by averaging relative wages in the various occupations; (b) weighting these differences by the Aldrich-reported employment in each of the industries to obtain the weighted average differences given on line 6. In order to lighten the heavy burden of computation, this was done only for July of each quinquennial year. Presumably, the average of January and July would have yielded somewhat different results.

[f] The remaining discrepancy could be due to several factors: (a) Mitchell includes several other industries which have only small weight in his result, but nevertheless they have some effect in causing his index to deviate from mine; (b) the discrepancies in lines 4-6 have been weighted by Aldrich-reported employment instead of census-reported employment; neither set of weights can yield a complete account of the discrepancy; (c) this study builds its averages up, for certain industries, by first computing state averages and then combining these state averages on the basis of the importance of the industry in those states as reflected in census-reported employment, whereas Mitchell combines his establishments wages directly by means of Aldrich-reported employment without regard to states. These differences are significant for a few industries such as cotton, woolens, and metals; (d) Mitchell includes a number of occupations for which wage data are missing during certain years; this study includes only those occupational wage series for which the data are almost completely continuous; (e) Mitchell's 1890 figure really refers to January 1891 whereas mine is the average of January and July 1890.

TABLE 6

Factors Explaining the Discrepancy in Relative Behavior between the Weighted Mean of Dollar Wages in Building Derived in This Study from the Aldrich Report, and the Weighted Mean of Relative Wages Derived from It by Wesley Mitchell: 1860-1890
(Basic Data, Averages of January and July; 1860 = 100)

| | *1860* | *1865* | *1870* | *1875* | *1880* | *1885* | *1890* |
|---|---|---|---|---|---|---|---|
| 1. Mitchell | 100 | 150 | 188 | 167 | 141 | n.c. | 169[a] |
| 2. This study | 100 | 151 | 181 | 159 | 127 | 151 | 159 |
| 3. Excess of line 1 over line 2 | – | −1 | 7 | 8 | 14 | – | 10 |
| Estimated discrepancy due to fact that this study: | | | | | | | |
| 4. Uses census weights on state level instead of averaging directly with Aldrich weights[b] | – | 0 | 2 | 2 | 3 | – | 1 |
| 5. Computes dollar averages before converting to relatives[c] | – | −1 | 4 | 7 | 8 | – | 8 |
| 6. Sum of lines 4 and 5 | – | −1 | 6 | 9 | 11 | – | 9 |
| 7. Remaining discrepancy[d] | – | 0 | 1 | −1 | 3 | – | 1 |

n.c. Not computed by Mitchell.

Source and explanation: Mitchell, *Gold, Prices, and Wages*, pp. 94, 95, 120, 173; this study, Appendix Table A-1.

[a] January 1891.

[b] Line 4 was computed by subtracting (a) my average of dollar wages for building trades occupations, weighted by Aldrich-reported employment on the occupational and firm level and by census-reported employment on the state level, from (b) my average of dollar wages for building trades weighted by Aldrich-reported employment on all levels.

[c] Line 5 was computed by substituting my average of *dollar* wages for building trades occupations weighted by Aldrich-reported employment, from Mitchell's average of *relative* wages similarly weighted.

[d] The remaining discrepancy is explained by: (a) This study does not use occupational wage series with substantial gaps between 1860 and 1890; (b) Mitchell's figure for 1890 is really for January 1891, whereas mine is the average for January and July 1890. (c) In order to lighten the heavy burden of computation, lines 4 and 5 were computed for only July. If the differences for January had been included, the average for each quinquennial year would have been somewhat different.

## *Comparison of Average Wages Obtained in This and Other Investigations Using Weeks Data*

My wage series and that prepared by Mitchell are the only two Weeks series which, so far as I am aware, have been constructed in any systematic way, the Weeks Report not furnishing an analysis of its own wage materials.[11]

[11] Hansen makes some use of the Weeks data in his series B, but tells nothing about his method (*op.cit.*).

TABLE 7

Relatives of Average Daily Wage-Rates Computed in This and Mitchell's Investigations from the Weeks Report: 1860-1880

| | *This Study:* 18 *Manufacturing Industries, Weighted Means*[a] | *Mitchell:* 30 *Manufacturing Industries, Unweighted Medians*[b] |
|---|---|---|
| 1860 | 100 | 100 |
| 1865 | 138 | 139 |
| 1870 | 146 | 155 |
| 1875 | 139 | 145 |
| 1880 | 134 | 138 |

Source: Appendix Table A-3; Mitchell, *Gold, Prices, and Wages*, pp. 176-177.
[a] 67 establishments.
[b] 144 establishments, p. 176.

The two studies differ markedly in coverage and method. The present study relies on 67 establishments in 18 industries for which data cover the period 1860-80 without serious gap. It computes unweighted means on the occupational and establishment level, and means weighted by census-reported employment on the state and industry levels. And it derives weighted averages of dollar wages before converting them into relatives. Mitchell covered 144 establishments in 30 industries. He computed unweighted medians of occupational series. And he converted his occupational wage data into relatives before computing his unweighted medians.

The two series based on Weeks and presented in Table 7 for quinquennial years reveal comparative behavior analogous to that for the Aldrich Report: my series rising relatively less than Mitchell's during and after the Civil War, and advancing less between 1860 and 1880. The explanation is no doubt largely the same as that for the Aldrich data, with the added fact that my average was a mean and Mitchell's was a median; but the labor involved in testing the source of the differences was so great that the test was not repeated in the case of the Weeks data.

## *Comparison of Average Wages from the Several Sources of Wage Data*

The results derived from Aldrich and Weeks have not yet been compared with each other or with the data derived from other sources described earlier in the book, namely; Bulletin 18 of the Department of Labor covering 1870-90, the First Annual Report of the Commissioner of Labor for 1885, or the Dewey Report for 1890.

ALDRICH AND WEEKS

The averages from these two, during the two decades between 1860 and 1880, on the whole manifested similar patterns of behavior. Both showed a rapid rise during and after the Civil War to a peak in the early 1870's, a marked decline to a low point in the late 1870's and a net advance from 1860 to 1880. However, two differences are noted. The Aldrich daily wage (as computed in this study) was substantially lower throughout than the Weeks average: in 1860, $1.19 compared with $1.32; in 1880, $1.54 compared with $1.77. And the Aldrich average fluctuated a bit more than the Weeks average during the Civil War boom and the deflation of the 1870's.

It will be remembered that the Aldrich Report covered industries located entirely in eastern states, whereas the Weeks Report had representation in the West and South also. Were the lower level of wages and the higher relative fluctuation of the Aldrich data due to those differences? To test the possibility, the Aldrich average was compared with the Weeks average for the eastern states—but without significantly different results.

Could the explanation lie in the industries covered? Separate averages were computed for wages in the six industries common to the two reports—cotton goods, woolen goods, lumber, paper, breweries, and metals. There was no certainty that industries called by the same names produced the same commodities. For example, it was necessary to assume that saw and planing mills in the Weeks Report were the same as lumber in the Aldrich Report, and that the three metal industries—iron blast furnaces, rolling mills, and nail factories; machinery; and stove foundries—in the Weeks Report correspond to the category called metals and metallic goods in the Aldrich Report. As before, my Aldrich wage average was lower than my Weeks average at each decennial date although the differences in level were smaller, but the fluctuations of the two six-industry averages were almost exactly the same. It would seem that although the lower absolute level of the Aldrich wage data was an inherent characteristic, the wider fluctuation was due to the differences in industrial coverage.[12]

During 1870-90 the data of the Aldrich Report for 13 manufacturing industries may be compared with those of Bulletin 18 of

[12] Wesley Mitchell made a similar finding as a result of his comparison for the three individual industries with substantial numbers of firms reporting in each set of data: cotton, woolens, and metals. In each case he used the unweighted median of relative occupational wage quotations. He concluded: "The general result of these comparisons is to strengthen the claim of both sets of figures to recognition as a reliable indication of the trend and, broadly speaking, the degree of variations in wage-rates in manufacturing industries from 1860 to 1880." *Gold, Prices, and Wages*, p. 217.

the Department of Labor for ten occupations more or less identifiable with manufacturing. This comparison for quinquennial dates indicates again that the Aldrich average wages were lower in absolute level—roughly 10 percent—throughout the period, but that they manifested rather similar fluctuations: both declining by a sixth or a

TABLE 8

Daily Wage-Rates in Selected Occupations: Aldrich and Bulletin 18 Data Compared by States, 1870-1890

| *State, and number of establishments or city reported on* | *Current Dollars* | | | | | *Percentage Changes* | |
|---|---|---|---|---|---|---|---|
| | 1870[a] | 1875[a] | 1880 | 1885 | 1890 | 1870-1890 | 1880-1890 |
| | | | BLACKSMITHS | | | | |
| Maryland | | | | | | | |
| Aldrich (1 est.) | 2.59 | 2.42 | 2.09 | 2.35 | 2.38 | −8 | 14 |
| Bulletin 18 (Balt.) | 2.38 | 2.09 | 2.21 | 2.24 | 2.12 | −11 | −4 |
| New York | | | | | | | |
| Aldrich (4 est.[b]) | 2.84 | 3.06 | 2.42 | 2.55 | 2.89 | 2 | 19 |
| Bulletin 18 (N.Y.C.) | 2.73 | 2.67 | 2.68 | 2.63 | 2.83 | 4 | 6 |
| Massachusetts | | | | | | | |
| Aldrich (1 est.) | 3.00 | 3.50 | 2.75 | 3.25 | 3.25 | 8 | 18 |
| Bulletin 18 (Boston) | 3.64 | 3.02 | 2.94 | 3.02 | 2.80 | −23 | −5 |
| Pennsylvania | | | | | | | |
| Aldrich (2 est.[b]) | 2.84 | 2.46 | 1.96 | 1.98 | 2.16 | −24 | 10 |
| Bulletin 18 (Phila. and Pittsburgh[c]) | 2.28 | 2.42 | 2.15 | 2.31 | 2.31 | 1 | 7 |
| | | | CARPENTERS | | | | |
| Maryland | | | | | | | |
| Aldrich (1 est.) | 2.72 | 2.33 | 2.00 | 2.59 | 2.59 | −5 | 30 |
| Bulletin 18 (Balt.) | 2.57 | 2.09 | 2.15 | 2.42 | 2.43 | −5 | 13 |
| New York | | | | | | | |
| Aldrich (2 est.[b]) | 3.49 | 3.06 | 2.12 | 2.63 | 2.94 | −16 | 39 |
| Bulletin 18 (N.Y.C.) | 3.49 | 3.43 | 3.41 | 3.49 | 3.48 | 0 | 2 |
| Massachusetts | | | | | | | |
| Aldrich (1 est.) | 2.50 | 2.29 | 1.69 | 1.95 | 2.20 | −12 | 30 |
| Bulletin 18 (Boston) | 2.59 | 2.15 | 2.29 | 2.42 | 2.52 | −3 | 10 |
| Pennsylvania | | | | | | | |
| Aldrich (2 est.[b]) | 2.58 | 2.55 | 2.50 | 2.74 | 2.73 | 6 | 9 |
| Bulletin 18 (Phila. and Pitts.[c]) | 2.87 | 2.62 | 2.16 | 2.72 | 2.72 | −5 | 26 |

Table 8 (*continued*)

| *State, and number of establishments or city reported on* | *Current Dollars* | | | | | *Percentage Change* | |
|---|---|---|---|---|---|---|---|
| | 1870[a] | 1875[a] | 1880 | 1885 | 1890 | 1870-1890 | 1880-1890 |
| | | | COMPOSITORS | | | | |
| New York | | | | | | | |
| Aldrich (2 est.[b]) | 3.00 | 3.00 | 2.52 | 2.43 | 2.50 | −17 | −1 |
| Bulletin 18 (N.Y.C.) | 3.07 | 2.90 | 2.98 | 3.03 | 3.06 | 0 | 3 |
| | | | MACHINISTS | | | | |
| Maryland | | | | | | | |
| Aldrich (1 est.) | 2.56 | 2.56 | 2.39 | 2.56 | 2.55 | 0 | 7 |
| Bulletin 18 (Balt.) | 2.26 | 2.31 | 2.29 | 2.31 | 2.32 | 3 | 1 |
| New York | | | | | | | |
| Aldrich (5 est.[b]) | 2.50 | 2.72 | 2.10 | 2.44 | 2.38 | −5 | 13 |
| Bulletin 18 (N.Y.C.) | 2.75 | 2.62 | 2.53 | 2.50 | 2.70 | −2 | 7 |
| Massachusetts | | | | | | | |
| Aldrich (4 est.[b]) | 2.77 | 2.44 | 2.12 | 2.45 | 2.31 | −17 | 9 |
| Bulletin 18 (Boston) | 3.00 | 2.67 | 2.43 | 2.53 | 2.58 | −14 | 6 |
| Pennsylvania | | | | | | | |
| Aldrich (2 est.[b]) | 2.78 | 2.37 | 2.11 | 2.28 | 2.60 | −6 | 23 |
| Bulletin 18 (Phila. and Pittsburgh[c]) | 2.17 | 2.22 | 2.03 | 2.29 | 2.24 | 3 | 10 |
| | | | PAINTERS | | | | |
| Maryland | | | | | | | |
| Aldrich (1 est.) | 3.00 | 2.50 | 1.75 | 2.50 | 2.50 | −17 | 43 |
| Bulletin 18 (Balt.) | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 0 | 0 |
| New York | | | | | | | |
| Aldrich (2 est.[b]) | 4.50 | 3.42 | 2.85 | 3.00 | 3.50 | −22 | 23 |
| Bulletin 18 (N.Y.C.) | 2.97 | 3.27 | 3.15 | 3.38 | 3.55 | 20 | 13 |
| Massachusetts | | | | | | | |
| Aldrich (2 est.[b]) | 2.15 | 2.15 | 1.75 | 2.41 | 1.89 | −12 | 8 |
| Bulletin 18 (Boston) | 4.25 | 3.97 | 2.98 | 2.48 | 3.10 | −27 | 4 |
| Pennsylvania | | | | | | | |
| Aldrich (1 est.) | – | 2.94 | 2.35 | 2.57 | 2.74 | – | 17 |
| Bulletin 18 (Phila. and Pitts.[c]) | 2.81 | 2.80 | 2.45 | 2.78 | 2.78 | −1 | 13 |

[a] Converted from gold to currency by multiplying the gold wages during 1870-79 by the following ratios: for 1870, 1.213; 1871, 1.107; 1872, 1.091; 1873, 1.127; 1874, 1.114; 1875, 1.125; 1876, 1.128; 1877, 1.062; 1878, 1.014. (The wage data, originally expressed in currency, were converted into gold in Bulletin 18.) Multiplying by the above ratios has reconverted them into the original currency.

[b] Mean, weighted by employment.

[c] Mean, weighted by numbers reported by the census for these occupations.

seventh from 1870 to 1880, and both recovering most of this during 1880-90, with a net decline over the twenty years of a few percent.

Bulletin 18 covered mainly skilled occupations in large cities in all sections of the nation; the Aldrich data skilled and semiskilled occupations in communities of unknown but widely varying size, located in eastern states only. What happens if we compare only occupations of the same names in the same states? This we do in Table 8 for blacksmiths, carpenters, compositors, machinists, and painters in Maryland, New York, Massachusetts, and Pennsylvania. The results were not encouraging. There was fairly close agreement in net change between 1870 and 1890 in the case of blacksmiths in Maryland and New York, carpenters in Maryland, and machinists in Maryland, New York, and Massachusetts, but not much in the other occupational-state comparisons. There was also little agreement in fluctuation. The rather similar movement of the over-all averages thus seems to have been the result of the offsetting of differences in occupational, geographical, and even industrial coverage.[13]

### THE ALDRICH, FIRST ANNUAL, AND DEWEY REPORTS

The First Annual Report of the Commissioner of Labor referred only to 1885 and could not reveal fluctuations in wages over time, but it covered about 130,000 workers in nearly 40 manufacturing industries. Its wage level was substantially lower: $1.44, in 1885 compared with $1.61 for the Aldrich Report and $1.87 for Bulletin 18 for that year. In an effort to reveal whether this discrepancy was due to differences in industrial and geographical or occupational coverage, the wages were compared, from the two reports, for the same industry, occupation, and states: e.g., male mule spinners in cotton goods in Massachusetts (Table 9). Even greater discrepancy was disclosed between the Aldrich and First Annual Reports, with the average for 12 occupations in seven states being about 28 percent higher in the Aldrich data. The discrepancy varied widely by occupation, but Aldrich wages were higher in two out of three of the comparisons.

The probability that the Aldrich wage level, though lower than the Weeks level, was inherently higher than the wage level of all manufacturing workers in the United States, was further supported by the Dewey-Census Report, based on 1890 wage data of many thousands of workers. Comparison of hourly wages for 10 industries

[13] The ten occupations included in the Bulletin 18 average, while presumed here to represent manufacturing, may also be found in nonmanufacturing industries such as transportation.

TABLE 9

Wage-Rates in Same Industry, Occupation, and State: Selected Data Comparing Aldrich Report and First Annual Report, 1885
(wages and hours are weighted averages)

| *Industry and Occupation* | *Number Employed* | *Hours per Day* | *Daily Wage* | *Hourly Wage* |
|---|---|---|---|---|
| | MASSACHUSETTS | | | |
| Cotton goods | | | | |
| Mule spinners, male | | | | |
| Aldrich[a] | 22 | 10.5 | 1.63 | .155 |
| First Annual | 274 | 10 | 1.25 | .125 |
| Weavers, male | | | | |
| Aldrich | 292 | 11 | 1.20 | .109 |
| First Annual | 390 | 10 | 1.13 | .113 |
| Weavers, female | | | | |
| Aldrich | 331 | 11 | 1.03 | .094 |
| First Annual | 2,018 | 10 | .94 | .094 |
| Laborers, male | | | | |
| Aldrich | 14 | 10 | 1.27 | .127 |
| First Annual | 127 | 10 | 1.08 | .108 |
| Woolen and worsted goods | | | | |
| Loom fixers, male | | | | |
| Aldrich | 7 | 10 | 1.93 | .193 |
| First Annual | 10 | 10 | 1.90 | .190 |
| Carders, male | | | | |
| Aldrich | 7 | 10 | 1.15 | .115 |
| First Annual | 18 | 10 | 1.18 | .118 |
| | CONNECTICUT | | | |
| Woolen and worsted goods | | | | |
| Loom fixers, male | | | | |
| Aldrich | 3 | 11 | 2.20 | .200 |
| First Annual | 2 | 11 | 1.35 | .123 |
| Weavers, female | | | | |
| Aldrich | 15 | 11 | 1.40 | .127 |
| First Annual | 61 | 11 | 1.05 | .096 |
| Burlers, female | | | | |
| Aldrich | 8 | 11 | .82 | .075 |
| First Annual | 13 | 11 | .69 | .063 |
| | NEW YORK STATE | | | |
| Cotton goods | | | | |
| Mule spinners, male | | | | |
| Aldrich | 4 | 11 | 1.65 | .150 |
| First Annual | 157 | 11 | 1.32 | .120 |
| Weavers, female | | | | |
| Aldrich | 57 | 11 | .83 | .076 |
| First Annual | 1,229 | 11 | .90 | .082 |

Table 9 (*continued*)

| *Industry and Occupation* | *Number Employed* | *Hours per Day* | *Daily Wage* | *Hourly Wage* |
|---|---|---|---|---|
| | NEW YORK STATE, (*continued*) | | | |
| Metals and metallic goods | | | | |
| Machinists, male | | | | |
| Aldrich | 132 | 10 | 2.26 | .226 |
| First Annual | 281 | 10.1 | 1.93 | .191 |
| Pattern makers, male | | | | |
| Aldrich | 21 | 10 | 2.80 | .280 |
| First Annual | 12 | 10 | 2.28 | .228 |
| Molders, male | | | | |
| Aldrich | 45 | 10 | 2.37 | .237 |
| First Annual | 7 | 10 | 2.50 | .250 |
| Blacksmiths, male | | | | |
| Aldrich | 23 | 10 | 2.60 | .260 |
| First Annual | 35 | 11 | 2.25 | .204 |
| | PENNSYLVANIA | | | |
| Metals and metallic goods | | | | |
| Machinists, male | | | | |
| Aldrich | 68 | 10 | 2.28 | .228 |
| First Annual | 181 | 10.4 | 2.35 | .226 |
| Laborers, male | | | | |
| Aldrich | 90 | 10 | 1.23 | .123 |
| First Annual | 1,934 | 10.3 | 1.20 | .117 |
| Pattern makers, male | | | | |
| Aldrich | 10 | 10 | 2.24 | .224 |
| First Annual | 2 | 10 | 3.00 | .300 |
| Molders, male | | | | |
| Aldrich | 42 | 10 | 2.28 | .228 |
| First Annual | 135 | 10 | 2.28 | .228 |
| Blacksmiths, male | | | | |
| Aldrich | 9 | 10 | 2.00 | .200 |
| First Annual | 240 | 10.1 | 1.84 | .183 |
| | MARYLAND | | | |
| Metals and metallic goods | | | | |
| Machinists, male | | | | |
| Aldrich | 23 | 10 | 2.53 | .253 |
| First Annual | 1 | 12 | 2.30 | .192 |
| Laborers, male | | | | |
| Aldrich | 16 | 10 | 1.22 | .122 |
| First Annual | 25 | 12 | 1.25 | .104 |
| | NEW JERSEY | | | |
| Metals and metallic goods | | | | |
| Machinists, male | | | | |
| Aldrich | 5 | 10 | 2.55 | .255 |
| First Annual | 4 | 9 | 2.00 | .222 |

Table 9 (*concluded*)

| *Industry and Occupation* | *Number Employed* | *Hours per Day* | *Daily Wage* | *Hourly Wage* |
|---|---|---|---|---|
| | NEW JERSEY, (*continued*) | | | |
| Laborers, male | | | | |
| Aldrich | 6 | 10 | 1.59 | .159 |
| First Annual | 12 | 9 | 1.35 | .150 |
| Pattern makers, male | | | | |
| Aldrich | 3 | 10 | 3.15 | .315 |
| First Annual | 4 | 9 | 2.40 | .267 |
| | NEW HAMPSHIRE | | | |
| Metals and metallic goods | | | | |
| Machinists, male | | | | |
| Aldrich | 6 | 10 | 1.75 | .175 |
| First Annual | 5 | 10 | 2.25 | .225 |
| Molders, male | | | | |
| Aldrich | 15 | 12 | 2.13 | .177 |
| First Annual | 25 | 10 | 2.00 | .200 |
| | 12 OCCUPATIONS IN 7 STATES | | | |
| Aldrich | 1,274 | 10.6 | 1.51 | .143 |
| First Annual | 7,202 | 10.4 | 1.18 | .113 |

Source: Aldrich Report, Vol. 3, Parts 2-4, Table XII; *First Annual Report of the Commissioner of Labor*, 1886, Appendix A.

[a] The Aldrich data throughout are for July.

(Table 10) once more suggests a higher general level for Aldrich wage rates, though again there were exceptions.

## *Averages of Wages from a Constant List versus an Increasing List of Occupations or Establishments*

The main analysis has rested on those occupations, establishments, and industries for which wage data were available throughout 1860-80 in the Weeks Report, or throughout 1860-90 in the Aldrich Report, thus leaving out many for which fragmentary wage data were available after 1860. Doesn't this omission introduce bias? After all, a continuous wage history over a long period can come only from well-established firms in older industries. Not all of the firms and occupations whose data began later than 1860 were new; the lack of early data was often due to lost records or a change of ownership. But in a rapidly growing nation would not the proportion

TABLE 10

Comparison of Hourly Wages from the Aldrich Report and the Dewey Report, Ten Manufacturing Industries, 1890

| | *Number of Employees for Whom Wages Were Reported* | | *Hourly Wage Rates* | | |
|---|---|---|---|---|---|
| | | | *Median of Occupations,*[a] | *Median of Individual Workers,* | *Column 3 Minus Column 4* |
| | *Aldrich* (1) | *Dewey* (2) | *Aldrich* (3) | *Dewey* (4) | (5) |
| Agricultural implements | 51 | 4,134 | .17 | .16 | .01 |
| Ale, beer, porter (breweries) | 64 | 3,434 | .16 | .20 | −0.04 |
| Books and newspapers (printing) | 192 | 3,587 | .25 | .26 | −0.01 |
| Carriages and wagons | 40 | 2,098 | .25 | .16 | .09 |
| Cotton textiles | 1,079 | 6,757 | .12 | .10 | .02 |
| Leather (tanneries) | 83 | 2,581 | .16 | .15 | .01 |
| Lumber and planing mills | 23 | 2,307 | .10 | .14 | −0.04 |
| Metals and metallic goods (foundries and metal working) | 1,810 | 24,266 | .22 | .16 | .06 |
| Paper | 27 | 1,121 | .08 | .13 | −0.05 |
| Woolen textiles | 595 | 7,995 | .13 | .10 | .03 |
| Ten industries: | | | | | |
| Employees reported on weighted median rate | 3,964 | 58,280 | .22 | .16 | .06 |
| All industries:[b] | | | | | |
| Employees reported on weighted average rate | | 120,848 | .17 | .15 | .02 |

[a] Weighted by employment in those occupations. The median daily wage in July was divided by the mean hours in the workday from Table 13.

[b] Thirteen industries from the Aldrich Report; 31 industries from the Dewey Report, listed in Appendix, Table A-8.

Source: Appendix Table A-1; Census of 1900, *Employees and Wages*, by Davis R. Dewey.

of new firms and new occupations be higher among those which furnished only recent data, and would not new firms, occupations, and industries have to pay higher wages in order to attract labor?

Two complete sets of occupational wage averages were compared in the Aldrich data: a list of wage series which remained constant over the entire period, and a list which increased from 462 occupations in 1860 to 675 in 1890. Comparison was made first for 12 industries, including: agricultural implements; ale, beer, and porter; books and newspapers; building trades; city public works; cotton goods; dry goods; illuminating gas; leather; metals and metallic goods; white lead; and woolen goods. Then comparison was made separately for building trades and 8 manufacturing industries. The differences could

TABLE 11

Weighted Average Daily Wage-Rates for a Constant List of 69 Establishments, 1860-1880, Compared with a List Including Establishments Newly Reporting during the Period; from the Weeks Report

The varying list increased from 69 establishments in 1860 to 212 in 1875
Wages are weighted by given-year employment[a]

| | *United States* | | | *Eastern States* | | | *Western States* | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Varying List* | *Constant List* | *Effect of Additions to List* | *Varying List* | *Constant List* | *Effect of Additions to List* | *Varying List* | *Constant List* | *Effect of Additions to List* |
| 1860 | 1.35 | 1.35 | – | 1.28 | 1.28 | – | 1.72 | 1.72 | – |
| 1865 | 1.96 | 1.96 | 0 | 1.90 | 1.88 | 0.02 | 2.32 | 2.37 | −0.05 |
| 1870 | 2.07 | 2.13 | −0.06 | 2.03 | 2.17 | −0.14 | 2.18 | 2.34 | −0.16 |
| 1875 | 1.86 | 1.89 | −0.03 | 1.76 | 1.85 | −0.09 | 2.17 | 2.20 | −0.03 |
| 1880 | 1.81 | 1.88 | −0.07 | 1.73 | 1.83 | −0.10 | 2.13 | 2.21 | −0.08 |

[a] Computed by taking the unweighted average of daily wages for appropriate occupations at the establishment level and averages weighted by census-reported employment at the state and industry levels. Employment in 1865 and 1875 was derived from the decennial censuses by linear interpolation.

less significant. The daily average wage for the list which increased differed from that for the constant list by two cents in 1890 and only one cent at the other five-year dates.

Instead of a higher wage, which might be expected, the addition of wage series yielded a slightly lower wage. Finally, the separate comparisons for building and manufacturing yielded similar differences—a trifle larger, but in no case exceeding a few cents a day.[14]

A more severe test can be administered through the Weeks data (Table 11). Of 212 establishments, only 69 had wage data covering the entire period of 1860-80.[15] Again the differences were slight. True, many manufacturing industries, especially new ones, were not covered by either the complete or the fragmentary sets of data, and those manufacturing industries not covered might have paid higher

[14] Conceivably, the insignificance of these differences has been due to the offsetting of wider differences for individual industries. In order to test this, a separate comparison was made for each industry. For example, the average daily wage for the 58 occupations in the woolens industry for the entire period 1860-90 is compared with that for the 102 occupations which include the above 58 plus the 44 with wage data becoming available at five-year intervals during 1860-90. These differences were larger than those for the industry groups (understandably, from randomness), but they were nevertheless small in all cases. The largest effect of increasing the list of occupations was 15 cents a day for agricultural implements in 1875 and 12-13 cents for ale and beer and for city public works in 1885 and 1890. The rest of the differences were under 10 cents, most of them under 5 cents.

[15] This was so not only for the United States, but also for eastern and western states considered separately.

hardly be wages or advanced them more than the industries studied here. This is not a problem that can be solved satisfactorily; completely new industries can probably never be adequately represented in any statistical sample.

## *Trends in Length of Workday*

The analysis has so far ignored length of workday. Would hourly wages have behaved differently from daily wages?

Weeks asked establishments to indicate the number of hours in a day's work at quinquennial dates between 1860 and 1880. He presented the replies in a frequency distribution, without regard to industry classification or employment, each item being a statement concerning hours; some establishments returned several statements for different classes of workers (Table 12).

TABLE 12

Hours per Day: Distribution of Manufacturers' Statements Concerning Length of Workday, Weeks Report, 1860-1880
(Percent)

| *Workday (hours)* | *1860* | *1865* | *1870* | *1875* | *1880* |
|---|---|---|---|---|---|
| 8 and less than 9 | 3.7 | 4.0 | 5.0 | 5.3 | 5.1 |
| 9-10 | 6.3 | 6.9 | 7.8 | 8.3 | 8.8 |
| 10-11 | 57.1 | 58.5 | 60.1 | 60.3 | 59.6 |
| 11-12 | 14.0 | 13.0 | 10.8 | 9.5 | 9.6 |
| 12-13 | 16.6 | 15.6 | 14.1 | 14.6 | 14.6 |
| 13-14 | 2.3 | 2.0 | 2.2 | 2.0 | 2.3 |
| All statements | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of statements[a] | 350 | 496 | 744 | 930 | 1,039 |
| Average hours per day[b] | 10.9 | 10.9 | 10.8 | 10.8 | 10.8 |

Source and explanation: Text of this chapter; Weeks Report, p. xxviii.

[a] A number of firms returned several statements about hours worked by different classes of workers.

[b] The average for each interval had to be taken arbitrarily as the midpoint of that interval. This arbitrary midpoint may have concealed some drift within the intervals.

The replies indicated that:

1. The average workday in 1880, 10.8 hours, was almost the same as it had been in 1860, 10.9 hours.
2. The most common workday (about 60 percent of the statements) at all five-year dates was 10 hours; the next in frequency (about 15 percent) was 12 hours (owing to the prevalence of the two-shift system); the one after that (10-15 percent) was 11

hours. Only a small percentage of statements indicated less than 10 or more than 12 hours. The longest were 15.5 hours, in breweries.[16] There were frequent reports of shorter workdays in the winter months and longer ones for the rest of the year—because of seasonal differences in daylight, temperature, and demand for goods.[17]

3. More substantial decreases occurred during 1860-80 for occasional establishments, e.g., in cotton and woolen manufactures, but increases occurred in others, e.g., in a saw and planing mill, and temporary reductions occurred during the 1870's depression in a very few, e.g., in a firm producing machinery.

What trend in hours is found in the Aldrich data? A weighted average for the 13 manufacturing industries (Table 13, Part A) indicated a workday of 10.9 hours in 1860, the same as in Weeks', but a somewhat shorter day in 1880.[18] A drop of four-tenths of an hour appears, compared to only one-tenth for the Weeks data. The latter might very well have concealed a greater downward drift within the class-interval distribution, but unfortunately there was no way of measuring such a drift. For the decade 1881-90, the Aldrich Report data show a further drop in the workday, to 10.1 hours. All of the decline for 1860-1890 was due to 4 industries: cotton, woolens, leather, and lumber; 8 industries showed almost no change and white lead actually manifested a rise. Even the larger decline in the Aldrich data suggests that the shrinkage in the workday in manufacturing would have been only 3.5 percent in the twenty years between 1860 and 1880, and only 7 percent by 1890. However, the Aldrich group of firms is not necessarily representative of manufacturing in general; the report itself states: "The reduction in the number of hours seems hardly so considerable as might have been expected. It must be remembered that our figures refer to certain picked establishments, where, in view of the complete organization at an early date, it is probable that shorter hours made an earlier appearance than in the mass of work shops."[19]

Despite these cautionary remarks, the Aldrich and Weeks data may not greatly misrepresent the length of the workday. The result

[16] In some of the very long-hour industries constant work was not performed during the whole number of reported hours e.g., puddlers in rolling mills and blacksmiths in hardware supply.

[17] A number of establishments reported a shorter day on Saturday, with the time made up by a slightly longer day during the week.

[18] In averaging the Weeks distribution, the mid-interval figure was chosen: for instance, 8 hours and less than 9 was given an arbitrary value of 8.5 hours.

[19] Pp. 179-180.

obtained from the very comprehensive data of the First Annual Report for 1885—whether for the entire 35 industries covered in that report, for the 12 of the 13 industries covered in the Aldrich

TABLE 13

Hours per Day in Manufacturing Industries, Based on Aldrich Report Hours Data; Annually 1860-1890

| | *1860* | *1870* | *1880* | *1890* |
|---|---|---|---|---|
| A. THIRTEEN INDUSTRIES; DECENNIAL YEARS[a] | | | | |
| Agricultural implements | 10.0 | 10.0 | 10.0 | 10.0 |
| Ale, beer, porter | 12.0 | 12.0 | 12.0 | 12.0 |
| Books and newspapers | 10.0 | 10.0 | 10.0 | 10.0 |
| Carriages and wagons | 10.0 | 10.0 | 10.0 | 10.0 |
| Cotton goods | 12.2 | 11.0 | 10.3 | 10.0 |
| Illuminating gas | 10.4 | 10.0 | 10.0 | 10.0 |
| Leather | 11.0 | 10.0 | 10.0 | 10.0 |
| Lumber | 10.8 | 10.8 | 10.8 | 10.0 |
| Metals | 10.1 | 10.1 | 10.1 | 10.1 |
| Paper | 12.0 | 12.0 | 12.0 | 12.0 |
| Stone | 10.0 | 10.0 | 10.0 | 9.8 |
| White lead | 9.3 | 10.5 | 10.5 | 10.7 |
| Woolen goods | 12.7 | 11.5 | 11.4 | 10.0 |
| Weighted average[b] | 10.9 | 10.6 | 10.5 | 10.1 |

B. THIRTEEN INDUSTRIES COMBINED; ANNUAL; ADJUSTED TO 1890 AVERAGE OF 10 HOURS FOR ALL MANUFACTURING

| | | | | | |
|---|---|---|---|---|---|
| 1860 | 10.8 | 1870 | 10.5 | 1880 | 10.4 |
| 1861 | 10.7 | 1871 | 10.5 | 1881 | 10.4 |
| 1862 | 10.7 | 1872 | 10.5 | 1882 | 10.4 |
| 1863 | 10.7 | 1873 | 10.5 | 1883 | 10.3 |
| 1864 | 10.7 | 1874 | 10.5 | 1884 | 10.3 |
| 1865 | 10.6 | 1875 | 10.4 | 1885 | 10.3 |
| 1866 | 10.7 | 1876 | 10.4 | 1886 | 10.2 |
| 1867 | 10.7 | 1877 | 10.4 | 1887 | 10.0 |
| 1868 | 10.6 | 1878 | 10.4 | 1888 | 10.0 |
| 1869 | 10.6 | 1879 | 10.4 | 1889 | 10.0 |
| | | | | 1890 | 10.0 |

Source: Aldrich Report, pp. 178-179; 1890 average for all manufacturing, see text note 20.

[a] The hours worked per day are indicated in detail for January and July of each year for each occupation. However, the schedule provided only a single box for hours at the top of the form. An exhaustive search was made of the archives of the various government agencies, in the hope of finding the original schedules filled out for the individual workers, but the search was completely without result.

[b] Weighted according to census-reported employment.

Report, or the 18 industries covered in the Weeks Report—was almost the same:

| | |
|---|---|
| Aldrich Report | |
| 13 Industries | $10\frac{1}{3}$ hours |
| First Annual Report[a] | |
| 35 industries | $10\frac{1}{3}$ hours |
| 12 of the 13 industries covered in the Aldrich Report | $10\frac{1}{2}$ hours |
| 18 industries covered in the Weeks Report | $10\frac{1}{2}$ hours |

[a] Computations made in this study.

Finally, the 1890 estimate of the Department of Commerce and Labor for 456 occupations in 48 industries, weighted by employment, yielded 10.0 hours a day,[20] compared with 10.1 hours computed from the Aldrich Report for that year.

Until better evidence is adduced, we judge that average hourly wages rose about 11 percent more than average daily wages during 1860-90: 61 percent compared with 50 percent (Appendix Table A-11).

[20] Actually 59.9 hours per week. Computed by Leo Wolman from the *Nineteenth Annual Report of the Commissioner of Labor* 1904; Wolman, *Hours of Work in American Industry*, National Bureau of Economic Research, Bulletin 71, 1938, p. 2.