

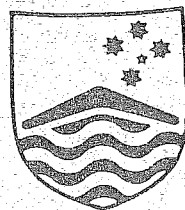
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AUSTRALIAN WORKFORCE AGGREGATES 1828-1901:
ESTIMATES FROM COLONIAL CENSUSES

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Introduction

Estimates of the Australian workforce to 1901 have, hitherto, been fragmentary and lacked detail on methods of derivation. Initially Butlin took "as a rough indicator" the ratio of dependants to occupied persons recorded in Colonial Censuses and made a linear interpolation between each to derive "reasonable indicators" of aggregate workforce growth over the period 1861-1900.¹ Kelley attempted to 'correct' Butlin's indicators by using, as a benchmark, participation rates by age and sex found in the 1911 Census and applied these to the known age structure of the population for each Census from 1861.² Taking a less hypothetical approach Butlin and Dowie compiled workforce estimates from 1861 - 71 based on New South Wales, Victoria, and South Australia,

¹ Butlin, N.G. Investment in Australian Economic Development 1861 - 1900, Cambridge, CUP, 1964, p.12.

² Kelley, A.C. 'Demographic Change and Economic Growth: Australia, 1861 - 1911', Explorations in Entrepreneurial History, 5(3) 1968, pp. 229-31.

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and on all Colonies from 1881 by referring directly to occupation abstracts in each Census.³

The following estimates are produced in preparation for the Bicentennial volume of Australian historical statistics. Although Colonial Census data on the workforce cannot be readily translated into post-1966 concepts, an attempt is made here to use a broad post-1966 workforce concept. The content of this concept emphasises current workforce activity viz., having a job or actively looking for work in the Census week. It excludes persons who lost their jobs through illness or accident and includes part-time workers, persons who lost their jobs because of short-term lay-off and helpers not receiving salary or wages. In contrast, the Colonial Censuses generally compiled workforce data on the basis of usual activity. Hence they often gave retired persons and those suffering from an injury or infirmity occupational status. Prior to 1854 Colonial Censuses did not significantly disaggregate occupational data. Moreover, 'Rank, Profession or Occupation' codes usually excluded women. Indeed, 'occupation' for a large portion of the Colonial period signified a person's social status and relevant 'calling'; it had little or nothing to do with the present notion of being 'currently active in the workforce'.

³ Butlin N.G. and Dowie J.A. 'Estimates of Australian Workforce and Employment 1861 - 1961', Australian Economic History Review. 9(2), 1969, pp. 141-42.

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It is not pretended in the following tables that the conceptual problems have been overcome. Direct translation of data from Censuses in the 1828-1901 period into post-1966 workforce concepts is not possible. Nevertheless, keeping a broad current activity concept in mind helps the compiler decide, on first-hand perusal of relevant Colonial Census tables, which occupational categories and social groups to include or exclude from the workforce aggregates. Overall, the more detailed nature of Census occupational data nearer the end of the period under review means that the aggregates estimated for years closer to and including 1901 are better approximations to a post-1966 workforce concept than earlier years.

TABLE 1
COLONIAL CENSUSES 1828 - 1901
WORKFORCE AGGREGATES : MALES

YEAR	NSW	Vic. (a)	Queens. (b)	South Aus. (c)	West Aus.	Tas.
1828	24528					
1833	38994					
1836	47891					
1841	69015					24081
1844				5972		
1846	81742			7978		
1847						39344
1848					2422	
1851	72255	31959		25257		33431
1854		121105			5840	
1855				27400		
1856	94882					
1857		190996				32227
1859					7133	
1861	132428	233797	14901	39698		32322
1864			27870			
1866				50221		
1868			43651			
1870					8853	31845
1871	172925	239007	49218	55177		
1876			73438	66451		
1881	254389	266821	82652	93499	12427	38227
1886			131576			
1891	367590	379852	149425	104923	18601	46908
1901	436678	376548	183872	120314	85514	55804

Notes

(a) Included with N.S.W. prior to 1851.

(b) Included with N.S.W. prior to 1861.

(c) Includes Northern Territory.

TABLE 2

COLONIAL CENSUSES 1828 - 1901

WORKFORCE AGGREGATES : FEMALES

YEAR	NSW	Vic. (a)	Queens. (b)	South Aus. (c)	West Aus.	Tas.
1828	1876					
1833	3478					
1836	4510					
1841	8728					2852
1844				1300		
1846	13187			1592		
1847						4372
1848					417	
1851	13930	5410		5478		4959
1854		15543			568	
1855				7733		
1856	25124					
1857		31115				7025
1859					947	
1861	28806	37938	1722	10807		7255
1864			4065			
1866				7555		
1868			4825			
1870					824	7874
1871	34444	55199	8792	9436		
1876			10950	11811		
1881	48580	77164	15221	17164	2156	9619
1886			31070			
1891	82672	93290	29831	23332	2382	11843
1901	121131	132216	39071	31655	13485	14830

Notes

- (a) Included with N.S.W. prior to 1851.
 (b) Included with N.S.W. prior to 1861.
 (c) Includes Northern Territory.

TABLE 3

COLONIAL CENSUSES : 1828 - 1901

WORKFORCE AGGREGATES : TOTAL

YEAR	N.S.W.	Vic. (a)	Queens. (b)	South Aus. (c)	West Aus.	Tas.
1828	26404					
1833	42472					
1836	52401					
1841	77743					
1844				7272		26933
1846	94929			9570		
1847						
1848						43716
1851	86185	37369		30735	2839	38390
1854		136648			6408	
1855				35133		
1856	120006					
1857		222111				39252
1859					8080	
1861	161234	271735	16623	50505		39577
1864			31935			
1866				57776		
1868			48476			
1870					9677	39719
1871	207369	294206	58010	64613		
1876			84388	78262		
1881	302969	343985	97873	110663	14583	47846
1886			162646			
1891	450262	473142	179256	128245	20983	58751
1901	557809	508764	222943	151969	98989	70634

Notes

(a) Included with N.S.W. prior to 1851.

(b) Included with N.S.W. prior to 1861.

(c) Includes Northern Territory.

TABLE 4

WORKFORCE AGGREGATES : SELECTED YEARS

1841 - 1901 : MALES (,000)

COLONY	1841	1846	1851	1854	1856	1861	1871	1881	1891	1901
N.S.W.	68.7	82.0	72.3	88.3	95.0	132.4	172.9	254.4	367.6	436.7
Victoria (a)			32.0	121.1	166.5	233.8	239.0	266.8	379.8	376.5
Queensland (b)						14.9	49.2	82.6	149.4	183.9
South Aust.	4.5	8.0	25.3	27.8	29.4	39.7	55.1	93.5	104.9	120.3
West Aust.		1.4	3.4	5.8	6.5	7.2	8.9	12.4	18.6	85.5
Tasmania	24.1	36.8	33.4	33.8	32.1	32.3	32.5	38.2	46.9	55.8
N.T. (c)										
AUSTRALIA	97.3	128.2	166.4	276.8	329.5	460.3	557.6	747.9	1067.2	1258.7

TABLE 5

WORKFORCE AGGREGATES : SELECTED YEARS

1841 - 1901 : FEMALES (,000)

COLONY	1841	1846	1851	1854	1856	1861	1871	1881	1891	1901
N.S.W.	9.0	13.0	13.9	18.2	25.0	28.8	34.5	48.6	82.7	121.1
Victoria (a)			5.4	15.6	27.1	37.9	55.2	77.2	93.3	132.2
Queensland (b)						1.7	8.8	15.2	29.8	39.1
South Aust.	1.0	1.6	5.5	6.2	8.3	10.8	9.5	17.2	23.3	31.6
West Aust.		0.2	0.6	0.6	0.6	1.0	0.8	2.2	2.4	13.5
Tasmania	2.9	4.1	4.9	5.0	7.0	7.3	8.0	9.6	11.8	14.8
N.T. (c)										
AUSTRALIA	12.9	18.9	30.3	45.6	68.0	87.5	116.8	170.0	243.3	352.3

(a) Included with NSW prior to 1851.

(b) Included with NSW prior to 1861.

(c) Included with South Australia.

TABLE 6

WORKFORCE AGGREGATES : SELECTED YEARS

1841 - 1901 : TOTAL (,000)

COLONY	1841	1846	1851	1854	1856	1861	1871	1881	1891	1901
N.S.W.	77.7	95.0	86.2	106.5	120.0	161.2	207.4	303.0	450.3	557.8
Victoria ^(a)			37.4	136.7	193.6	271.7	294.2	344.0	473.1	508.7
Queensland ^(b)						16.6	58.0	97.8	179.2	223.0
South Aust.	5.5	9.6	30.7	34.0	37.7	50.5	64.6	110.7	128.2	151.9
West Aust.		1.6	4.0	6.4	7.1	8.2	9.7	14.6	21.0	99.0
Tasmania	27.0	40.9	38.4	38.8	39.1	39.6	40.5	47.8	58.7	70.6
N.T. ^(c)										
MALES	97.3	128.2	166.4	276.8	329.5	460.3	557.6	747.9	1067.2	1258.7
FEMALES	12.9	18.9	30.3	45.6	68.0	87.5	116.8	170.0	243.3	352.3
AUSTRALIA	110.2	147.1	196.7	322.4	397.5	547.8	674.4	917.9	1310.5	1611.0

Notes

- (a) Included with N.S.W. prior to 1851.
(b) Included with N.S.W. prior to 1861.
(c) Included with South Australia.

Derivation of Estimates by Colony 1828-1901

In compiling benchmark estimates of aggregate workforce from the 54 separate Colonial Censuses in Australia up to 1901, eight major difficulties are encountered in:

- (i) determining the workforce participation of women;
- (ii) allowing for variations in the coding of helpers or assistants not receiving salary or wages (especially women on farms) between the workforce and dependent status;
- (iii) allowing for variations in the inclusion or exclusion of Chinese and Aborigines;
- (iv) treating elderly persons and juveniles in a uniform manner;
- (v) treating the 'imperfectly defined' and 'occupation not stated' classes in a uniform manner;
- (vi) allowing for inclusion in the 'usual occupation classes' of persons suffering from illness, accident, injury or debility - infirmities which would not enable those persons to carry on their usual workforce activities;
- (vii) allowing for non-simultaneous Census taking between the Colonies;
- (viii) standardising for variations in occupation codes, particularly those codes which apply to persons on the workforce periphery or not in the workforce.

In addition, there was no distinction between the part-time and full-time workforce in Colonial Censuses. Finally, prior to 1891 in most Colonies the 'unemployed' or persons 'out of employment' were not counted separately and were in

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some cases probably abstracted by their former occupations. This does not affect workforce figures directly, given that unemployed persons are normally included. Occasionally however, 'no occupation' and 'occupation not stated' codes may have included the unemployed. Since Registrar Generals and Statisticians gave no indication of this, persons tabulated as such were not considered unemployed and seeking work (hence not in the workforce). Unless otherwise noted below, the 'occupation not stated' group is distributed to the workforce or given non-workforce status according to the distribution of workforce/non-workforce by sex found in the rest of the population. The 'no occupation' group is excluded from the workforce.

The methods used in deriving workforce estimates here can be conveniently discussed in terms of three time periods: 1828-1851; 1854-1870 and 1871-1901. Further sections outline decisions taken to adjust females assisting on farms over the whole period to 1901 and the methods used to compile aggregates for selected years in Tables 4, 5 and 6.

I 1828 - 1851

All estimates up to and including the Censuses of 1851 in New South Wales, South Australia and Tasmania are compiled on a population basis. Participation rates for the male and female adult population aged 15 years and over and male juveniles aged between 10 and 15 years, are obtained from the comprehensive and detailed report on the Census of Victoria in April 1854. Age distribution data is obtained for each Census

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of 99% for male adults; 31% for female adults and 10% for male juveniles are applied retrospectively to the known age structures.

Calculations of male participation rates for Victoria in 1854 were made possible by the Registrar General's comment that 792 males under 15 years of age were employed.⁴ No data were provided on female juvenile employment. The female participation rate was calculated using total female employment as a percentage of females aged 15 years and over. Thus females in the workforce were underestimated but this should be offset by a likely overestimation of elderly females. No account was taken of possible variations in sex specific participation rates over the period 1828 - 1851. In other words, the 1854 Victorian rates were regarded as constant for the whole period in all Colonies.⁵

⁴ Census of Victoria 1854, 'Occupations of the People' p.4, Table II, footnote. It was assumed that all these males were aged between 10 and 15 years.

⁵ Exceptions were the early N.S.W. Censuses of 1828 and 1833. In these cases age data were only provided by sex in two groups: less than 12 years old and 12 years or older. As a result, the adult sex specific participation rates from Victoria in 1854 are applied to the population of persons of 12 years or older and possible juvenile male workforce participation is otherwise ignored.

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Up to 1851 the population of each colony was carefully enumerated but Censuses did not include detailed breakdowns of the occupational status of the population. Convicts were included in the estimates given that most were described in occupation abstracts as 'on bond and engaged on public works'; 'working on road gangs'; or 'in private assignment to colonists'. Those described as 'employed on Colonial vessels' but not included in age distribution data were added to workforce aggregates where relevant, and were assumed to be adults. Where a portion of the population was listed as 'age unspecified' this was distributed among the age groups according to ratios calculated for the bulk of the population. Aborigines were included since many were said to be 'in the employment of colonists'. (Although, Aborigines do not seem to have been counted in N.S.W. or Victoria). Lastly, the difficulty of assessing whether Chinese were counted in the occupation abstracts was not significant for the estimates during this period.⁶

⁶ In Victoria the few Chinese residents were not enumerated in 1861. See Census of Victoria 1861 Pt.V. "Occupations of the People" Table II, p.4 note.

II 1854 - 1870

From 1854 most Colonial Censuses especially in more heavily populated Colonies provide detailed occupational classifications that enable more accurate workforce estimation. Occupations were assigned to all persons according to their usual activity, including, for instance 'occupations' for children under the rubric of 'Scholar' or 'Domestic Duties'. Therefore, using a broad post-1966 workforce concept a number of groups had to be excluded. For example, in the 1854 Census of Victoria totals of 'scholars'; 'persons maintained at public cost or by the community' (including 'vagrants' in some other Colonies); of 'annuitants and independent means', 'prisoners', 'patients in hospitals and asylums' and unpaid persons 'engaged in domestic duties (including children)' were excluded from the workforce. The group of 'persons whose pursuits have not been specified or were unemployed' were broken into males and females; and distributed to the workforce/non-workforce according to sex specific workforce ratios found in the rest of the population. On the other hand the corresponding New South Wales category for 1856 and 1861 headed 'occupation not stated' was not distributed to the workforce/non-workforce according to ratios pertaining to the rest of the population. Commentaries in NSW Census reports for 1856 and 1861 stated that this category was "made up primarily of women and children"⁷.

⁷ Census of NSW 1856, Report p. xxvii.

or was "almost entirely children under educable age."⁸

The South Australian Censuses of 1851 and 1855; Western Australia 1859, and Tasmania 1857, 1861 and 1870 do not supply sufficiently disaggregated occupational data to allow accurate workforce estimation on the same basis as N.S.W. and Victoria. Accordingly, estimates for the former Colonies on those specific dates are compiled on a population basis using participation rates from the Censuses of Victoria (the most populous Colony from 1855) nearest to the time of each of the other Colonial Censuses. Thus the Victorian ratios of 1854 as detailed in Section I above, (10% of juvenile males 10-15 years; 99% of males 15 years or older and 31% of females 15 years or older), are applied to South Australia for 1851 and 1855. The Victorian ratios of 1857 (10% of juvenile males 10 to 15 years - assumed unchanged from 1854 given the absence of data on male juveniles employed in 1857; 99% adult males and 33% adult females) are applied to Tasmania 1857 and Western Australia 1859. The Victorian ratios of 1861 (unchanged except for 31% adult female participation rate) are applied to Tasmania for 1861 and the Victorian ratios of 1871 (unchanged from 1861) are applied to Tasmania for 1870.

⁸ Census of NSW 1861, 'Occupations of the People', p.12

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In all these applications females employed were regarded as adult females, i.e. 15 years of age or older (as discussed in Section I above). Further, the only juvenile male participation rate available from Victoria in 1854 was used in all cases.

Aborigines and Chinese are included in the estimates for those Colonies where enumerated. In Victoria Aborigines were counted from 1854, but only "a very few ... employed on stations" were returned.⁹ Otherwise, from 1861, all estimates are inclusive of Chinese and Aborigines in Victoria, Western Australia and South Australia even though many (especially Aborigines) were not enumerated. It is likely that Chinese and Aborigines with some form of employment were enumerated in New South Wales but no indication was given. In Queensland occupational data explicitly excluded Aborigines.

III 1871 - 1901

From 1871 all Censuses provide detailed occupational abstracts so that all the estimates here are based on these. Identical procedures are used to exclude obvious non-workforce groups from the estimates as in the 1854 - 1870 period. The 'occupation not stated' class was distributed between workforce/non-workforce using ratios of workforce to population by sex in the bulk of the population in each Colony. When separate codes appeared headed 'unemployed' from 1881 in New South Wales and all Colonies from 1891 these were included in the

'persons of property or rank not returned under any office or occupation' and 'no occupation' groups were excluded in addition to all the other categories discussed in Section II above.

It is likely that elderly persons were over-coded to occupational status in the Colonial period. This may be partially offset prior to 1871 by exclusion of annuitants, those of independent means, and persons in hospitals, asylums, or receiving public support. From 1871 those persons who were unable to follow their usual occupation by reason of infirmity or accident were also sometimes abstracted by their usual or former occupations. The New South Wales Census of 1871 included a new class of 'persons incapacitated from work not in hospitals or asylums' and these were excluded from the workforce. However, this class disappeared from the New South Wales Census after 1871 and did not feature in other Colonial Censuses. No count of the infirm or injured by usual occupation appeared in the 1881 New South Wales Census, so the 1891 Census illness/accident results were used to adjust the occupation data. In 1891 2.77 per cent of the recorded male workforce and 1.21 per cent of the recorded female workforce were also recorded as

¹⁰ Butlin and Dowie point out, correctly, "that few women were reported as 'unemployed' by census coders and one must suspect the data on this account." 'Estimates of Australian Workforce', p.142. No adjustment is made in estimates here to counter this (small) source of understatement for the female workforce.

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suffering from some illness/accident. These percentages were applied to the 1881 New South Wales Census. In 1881 7247 males and 570 females were excluded from the workforce on account of illness/accident. In 1891 the corresponding figures were 10452 males and 1013 females; and in 1901, 11215 males and 1719 females.

In Victoria (and other Colonies) prior to 1871 the small numbers enumerated as sick, infirm or injured are assumed to have been accounted for in the non-workforce categories.¹¹ From 1871 the number recorded as sick started to exceed those enumerated in relevant non-workforce categories such as those hospitalised, in asylums or supported by the community. Where the data are available: Victoria, South Australia, and Tasmania from 1871 and Queensland for 1901 those suffering from some infirmity or injured as a result of an accident and who were included in the workforce derived from occupation data were subsequently deducted from the workforce.

¹¹ Compare, for example, data on infirmity/accidents in the Census of Victoria 1861, 'Health of the People' Table 1, with numbers listed in relevant 'occupation' classes in that Census as hospitalised or maintained at public expense.

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In most cases those coded by illness/accident and also included in relevant workforce occupation categories constituted approximately 2 per cent of the recorded workforce before deduction.

Aborigines and Chinese were included in these estimates although in some Colonies full-blood Aborigines were not completely enumerated.

IV Female Helpers/Assistants on Farms

The recorded figures for unpaid family, and especially female, helpers or assistants on farms are suspect in Colonial Censuses. Mclean, Molloy and Lockett maintained that "this problem remains the most intractable in securing satisfactory rural employment estimates."¹² There are no clear grounds on which males in the helper category should be excluded from the farming workforce.¹³ However, some of the female data are more implausible.

It was decided that since some Censuses combined females living on farms with those actively assisting in the rural workforce, a breakdown of females as a percentage of the farming workforce in each Colony would serve as a point of departure

¹² Mclean, I.W., Molloy, S.F., and Lockett, P. 'The Rural Workforce in Australia 1871-1911', Australian Economic History Review 22 (2), 1982, p.175.

¹³ See Butlin and Dowie, 'Estimates of Australian Workforce', p.142.

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for any adjustments.¹⁴

The following tables detail decisions taken to adjust the female farming workforce in New South Wales, Victoria and Queensland. No adjustments were made for other Colonies. Farming includes 'agricultural', 'pastoral', 'grazing', and 'horticultural' categories in each Census.

¹⁴ The Victorian Censuses of 1871 and 1881 and the Queensland Census of 1891 treated most of the adult females living on farms as farmers.

(1) New South Wales Female Farming Workforce

Census	Total Farming Workforce	Female Farming Workforce	Females as Percentage of Farming Workforce
1856 ^a	34866	4532	13.0
1861	53902	6986	13.0
1871 ^b	63845	7661	12.0
1881 ^c	81910	8928	10.9
1891	110805	12114	10.9
1901 ^d	140064	17018	13.8

Notes on Adjustments

- (a) 1856 estimates are made on the basis of the 1861 NSW female farming workforce participation percentage. Originally no females were recorded in this Census as occupied on farms.
- (b) The original 1871 figure for females in the farming workforce was 5.3%. This was adjusted upwards by interpolation between 1861-1881. The adjustment is consistent with that made by the New South Wales Statistician in comparing 1871 results with those of 1891. He revised the 1871 figure upwards by 6,000. See Coghlan, T.A. Results of a Census of New South Wales 1891 (Sydney, 1894) Part 8, Occupations, Table I p.579. The adjustment made in my estimates is 5,634.
- (c) The original 1881 figure for females in the farming workforce was 2.54%. This was adjusted upwards in line with the 1891 figure, and gives greater consistency with earlier and subsequent data. A total of 7023 females were added to the farming workforce.

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(d) The original 1901 figure for females in the farming workforce was 3.62%. This was adjusted upwards to 13.8% by the Statistician in a footnote to the Occupations Table to give more consistency with previous Censuses in New South Wales. See Census of New South Wales 1901, Occupations, Table VI, p.635. A total of 12,403 females were added to the farming workforce.

(2) Victoria Female Farming Workforce

Census	Total Farming Workforce	Female farming Workforce	Females as Percentage of Farming Workforce
1854 ^a	16635	2148	12.9
1857	37010	4835	13.1
1861	50301	7118	14.1
1871 ^b	64331	6522	10.0
1881 ^c	87770	10575	12.0
1891	97778	10842	11.0
1901 ^d	118240	16350	13.8

Notes on Adjustments

(a) The original 1854 figure for females in the farming workforce was 0.64%. This percentage was moved up in line with the 1857 figure, adding 2053 females to the farming workforce.

(b) The original 1871 figure for females in the farming workforce was 29.8%. This probably included females who were merely living on farms. The adjustment here follows Mclean et.al. 1982, who estimate the participation rate 'of females living on farms in the agricultural workforce at approximately 28%'. Mclean et.al. 'The Rural Workforce in Australia', p.176. This estimate is obtained from a remark by the Queensland Statistician in 1901 who provided information to allow calculation of the female farming workforce 'participation rate'. When the Victorian female

effect is to bring the female farming workforce percentage into line with percentages recorded for other years. A total of 17,996 females were deducted from the original farming workforce.

- (c) The original 1881 figure for females in the farming workforce was 35.4%. The same comments apply as note (b), and the same adjustment percentage was used. A total of 31,757 females were deducted from the original farming workforce.
- (d) The original 1901 figure for females in the farming workforce was 19.7%. This was much lower than the preceding two Censuses but still implausible. The original figure was adjusted in line with the New South Wales percentage in 1901. A reduction following the Mclean et.al percentage would have resulted in a figure quite out-of-step with both New South Wales data and adjusted data for females as a percentage of the farm workforce in previous Victorian Censuses. By adjusting the female percentage to 13.8% of the farming workforce a total of 8,600 females were deducted from the original total.

(3) Queensland Female Farming Workforce

Census	Total Farming Workforce	Female Farming Workforce	Females as Percentage of Total Farming Workforce
1861	5502	303	5.5
1864	11057	397	3.6
1868 ^a	12299	95	0.8
1871	25092	2398	9.6
1876	27575	2468	9.0
1881	33267	3562	12.0
1886 ^b	55942	10542	18.8
1891 ^c	56365	5311	9.4
1901 ^d	62272	5983	9.6

Notes on Adjustments

- (a) Figures for 1868 remain the original ones from Census abstracts despite the low percentage recorded for females as a share of the farming workforce. The 1868 figure was not crucial for calculation of the selected aggregates in Tables 4, 5 and 6.
- (b) The same comment applies, mutatis mutandis, as for note (a).
- (c) It appears from the Statistician's Comment, Queensland Census Report 1901, p.931, that "most of the adult females on farms were treated as farmers". No adjustment was made in the estimates here because the overall female percentage was not inconsistent with 1871 and 1881 (1876 and 1886 not being crucial to aggregates in Tables 4, 5 and 6).
- (d) The original percentage of females in the farming workforce was 5.2. This was adjusted upwards by 2,874 females in line with the 1891 figure; the adjusted figures for New South Wales and Victoria and the Queensland Statistician's adjustment to 5983 females. Queensland Census Report 1901, p.931.

(4) South Australia : Female Farming Workforce^a

Census	Total Farming Workforce	Female Farming Workforce	Females as Percentage of Farming Workforce
1861	22900	3676	16.1
1866	20963	216	1.0
1871	24224	618	2.6
1881	32400	1612	5.0
1891	33883	2217	6.5
1901	41247	3257	7.9

(5) Tasmania^b

1881	19408	3290	16.9
1891	19023	1856	9.8
1901	21303	2437	11.4

(6) Western Australia^c

1881	4763	124	2.6
1891	8722	342	3.9
1901	10305	481	4.7

Notes

- (a) No adjustments made to South Australia data - there seemed no sound basis for alterations.
- (b) No adjustments made. No data available on females working on farms prior to 1881.
- (c) As for (b).

General Comment: Females in Farming Workforce

In the three most populous colonies, New South Wales, Victoria, and South Australia, there was striking agreement on the female farming workforce percentage in 1861 after which South Australia diverged. There may be grounds for adjusting the South Australian figures upwards from 1866, but this was not attempted since events in South Australia in this period were not incapable of producing the lower figures. In addition the unadjusted New South Wales and Victoria female farming workforce percentages are very similar in 1891 - hence they remain unadjusted. The unadjusted percentages in Queensland and Tasmania in 1891 are also close to the figure recorded in the larger Colonies.

The adjustments made here are to some extent arbitrary but the evidence points overwhelmingly to the conclusion that women constituted around 10 to 13 per cent of the farming workforce from 1854.¹⁵ The estimates here are certainly on the high

¹⁵ A similar conclusion is also reached by F.L. Jones, 'Is it True What They Said About Women?', RSSS, ANU, Dept. of Sociology Seminar Paper, 17/3/83, p.41. Jones estimates "around 10 per cent".

side in comparison with McLean et.al., who adjust, where intercensal comparisons of females returned as employed on farms "indicated inconsistent definitions" to 28 per cent of the recorded figure. It was difficult to pick just where counting definitions were inconsistent. The original percentage of females in the farming workforce was used here as a criterion of 'consistency'. Uncritical and uniform application of the McLean et.al., percentage would have produced wide variations in the percentage of women in the farming workforce and was therefore not justified. It was applied only to Victoria in 1871 and 1881 where the original percentage of females in the farming workforce was egregiously high. Also it was not defensible to accept all the Census female farm employment data at face value because some of the large variations, particularly in Victoria, took place in unacceptably short periods.¹⁶

V. Aggregates for Selected Years

Estimates in Tables 4, 5, and 6 are made for selected years when most Colonial Censuses were taken in the same year.

¹⁶ In a paper entitled 'Political Arithmetic: The Nineteenth Century Census and the Construction of the Dependent Women', R. S. S. S., ANU, Dept. of Demography Seminar Paper, 23/11/82, Table 1, Desley Deacon presents Colonial Census data on the female farming workforce (for Victoria and New South Wales) without adjustment.

Colonial Censuses were taken simultaneously for the first time in all Colonies only from 1881. Prior to 1881 straightforward linear interpolation, on the basis of workforce increase (or decrease) by sex, was used to estimate the workforce. The selected years were chosen on the criterion that either, and usually both, New South Wales and Victoria conducted Censuses in those years. When interpolation was used for the less populated Colonies the sex specific workforce participation rates computed for the base year were retained for subsequent years until the next Census was conducted.

Comparison With Earlier Colonial Workforce Estimates 1861-1901^a

	('000)				
	1861	1871	1881	1891	1901
Estimates from Table 6	547.8	674.4	917.9	1310.5	1611.0
Butlin (1964)	628.0	667.0	948.0	1367.0	1610.0
% Difference	-14.64	1.09	-3.28	-4.31	0.06
Kelley (1968)	544.2	692.0	953.4	1343.1	1585.6
% Difference	0.66	-2.61	-3.87	-2.49	1.58
Butlin and Dowie (1969)	580.0	635.0	900.1	1298.2	1543.7
% Difference	-5.88	5.84	1.94	0.94	4.18

Notes

(a) Using estimates from Table 6 as the base.

Butlin's (1964) initial estimates amount to no more than rough indicators and do not need detailed consideration. It is clear though, that his estimates for 1871 and 1901 are close, perhaps coincidentally, to those provided in this paper. It is not possible to provide sound reasons for this because Butlin did not give details on his method of derivation.

Kelley's (1968) estimates used 1911 Census participation rate data adjusted slightly for postulated long-term trends in sex and age-specific workforce participation rates, and these were applied to Census population data from 1861. Kelley's 1861 aggregate conforms closely to that provided in this paper and diverges significantly from Butlin (1964) and less so from Butlin and Dowie (1969). Butlin and Dowie estimated their 1861 figure on the basis of workforce participation rates averaged-out from New South Wales, Victoria and South Australia only. They applied

the following participation rates to the adult population in the other Colonies: 104 per cent males 14 - 65 years; 34 per cent females 14 - 65 years with an overall participation rate for the population of 78 per cent. Their figures for the male and female workforce were 482,600 and 97,400 respectively. This compares with 405,900 males and 77,500 females in the estimates provided in this paper. The figures from Butlin and Dowie are far too high and the more so when it is recalled that their estimates were reduced by 4.5 per cent to obtain comparability with 1921 workforce categories.¹⁷ The estimates for 1861 in this paper were made directly from occupation abstracts in the Victoria, New South Wales, South Australia and Western Australian Censuses. Victorian participation rates were used to obtain a workforce figure for Tasmania. Here perhaps is one other source of divergence. In comparison with participation rates used by Butlin and Dowie, those used here were 10 per cent for males 10-15 years, 99 per cent for males over 15 years and 31 per cent for females over 15 years. Only the male juvenile rate was hypothetical in

¹⁷ Butlin and Dowie "attempt to maximize continuity, accepting as part of the price possible distortion from the point of view of a given year description." Further, they tried to estimate "1891 on the basis of 1921 concepts and, in addition, on the basis of 1881 concepts. The former is less than the latter by as much as 4.5 per cent. Since the 1861 and 1871 Censuses cannot be readily translated directly in 1921 concepts, but related only to those of 1881, we have reduced the estimates for 1861, 1871 and 1881 by this proportion",

the sense that it was obtained from the 1854 Victorian Census; the other two were taken directly from the 1861 Victorian Census.

In comparison with Kelley's estimates from 1871, the estimates provided in this paper are about 2 per cent lower than they would have been if the infirm/accident stricken had been included. In that case Kelley's figures for 1871, 1881 and 1891 would be in close agreement with those provided in Table 6. His 1901 figure is not significantly different from the 1901 estimate in Table 6.

Butlin and Dowie based their estimates for 1871 on New South Wales, Victoria and South Australia only; reduced their aggregate for 1871 by 4.5 per cent in conformity with 1921 concepts and only made minimal adjustments, if any, to the female farming workforce in 1871. Considering their different estimation methods it is not surprising that their workforce aggregate diverges by 5.84 per cent from that provided in Table 6. For 1881 Butlin and Dowie considered all the Colonial Censuses but reduced their aggregate by 4.5 per cent in line with 1921 concepts. The estimates in Table 6 for 1881 were reduced by approximately

'Estimates of Australian Workforce', pp. 140, 142

(emphasis added).

31.

2 per cent to account for sickness/accident and 24,734 females were deducted from the farming workforce. Butlin and Dowie did not adjust the female farming workforce in 1881. When these differences in derivation are allowed for the workforce aggregate provided here is only approximately 1 per cent higher than the Butlin and Dowie estimate.

For 1891 no female farming adjustment was made in Table 6. The illness/accident downward adjustment, while it varied as before from colony to colony, was still of the order of 2 per cent of the unadjusted workforce. Despite this, the estimate in Table 6 is higher than that given by Butlin and Dowie. The male workforce in Table 6 is 20,300 higher and the female workforce is 8,000 lower. A large part of these differences must be due to the 1921 occupation and unemployment categories used by Butlin and Dowie to estimate the 1891 workforce. For the 1901 difference the same comment applies. In addition, Butlin and Dowie decided to "halve the female rural workforce in 1901". Their female workforce therefore exceeds that in Table 5 by 59,700 for 1901.

Notes on Sources

(1) The most comprehensive list of statistical sources on the 1828-1901 period is Ann E. Miller, Checklist of Nineteenth Century Australian Colonial Statistical Sources, Historical Bibliography Monograph No.7 1983, Bicentennial History Project.

This source gives a complete list of all 54 Colonial Censuses, their contents and their sources in Parliamentary Papers, Blue Books and Government Gazettes. It would be inappropriate to repeat this list here.

(2) The Census of New South Wales 1891, Statistician's Report, provided data on the age structure of the New South Wales population in 1828 and 1833.

(3) The following two monographs provided more detailed occupation and age structure information for the New South Wales Censuses of 1841 and 1846:

Ralph W. Mansfield, Analytical View of the Census of New South Wales For the Year 1841, Sydney, Kemp and Fairfax, 1841.

Ralph W. Mansfield, Analytical View of the Census of New South Wales For the Year 1846, Sydney, Kemp and Fairfax, 1847.

(4) A complete list of Colonial Censuses together with the total population enumerated at each Census can be found in the 1966 Census of Population Vol. 2, Part I, Table 9, p.9.

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SOURCE PAPERS IN ECONOMIC HISTORY

Copies of the Source Papers can be obtained, free of charge, from SP Distributions, Department of Economic History, RISS, Australian National University, G.P.O. Box 4, Canberra, ACT 2601.

1984

- No. 1 Rodney Maddock, Nilss Olekalns, Janette Ryan and Margaret Vickers, The distribution of income and wealth in Australia, 1914-1980: An introduction and bibliography, April 1984, 75pp.
- No. 2 N.G. Butlin and W.A. Sinclair, Australian gross domestic product 1788-1860: estimates, sources and methods, May 1984, 25pp.
- No. 3 A.M. Endres, Australian workforce aggregates 1828-1901: estimates from colonial censuses, June 1984, 32pp.