1 Introduction

Though traces of ‘economic thought’ in Cambridge may be detected as early as the 1770s, the earliest example to appear in print is contained in William Paley’s *The Principles of Moral and Political Philosophy* (1785), which brought its author instant fame and fortune. On the strength of its Book VI, Chap. XI, Maynard Keynes conjectured that ‘Perhaps, in a sense, he [rather than Malthus] was the first of the Cambridge economists’ (Keynes 1933 [1972]: 79, fn. 2).

William Paley (1743–1805) was a Yorkshire man and was mildly derided at Cambridge for speaking Latin with a Yorkshire accent. He was son of a clergyman and Cambridge graduate who became Master of Giggleswick School. The biographical information that follows is adapted from Waterman (2011).

I acknowledge with gratitude the generous assistance of Mr Nicholas Rogers, archivist of Sydney Sussex College, Cambridge University, for giving me access to the Hey archive and for transcribing material from Volume III of Hey’s ‘Lectures in Morality’. I also wish to acknowledge permission from Oxford University Press to make unrestricted use of Waterman (1996), much of which is incorporated in parts III and IV of this chapter. Also, I am very grateful to Dr Neil Hitchin for showing me his as yet unpublished report on Paley’s lecture notes, which include detailed notes of the lectures on ‘Moral Philosophy’ made by W. Thomas, son of Hugh Thomas, Master of Christ’s during Paley’s tenure as a Fellow and an undergraduate student of the college from 1774 to 1779.

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Paley was born in Peterborough in July 1743 where his father, the Revd William Paley, was a minor canon of Peterborough before his appointment to Giggleswick in 1745, upon which the family returned to Yorkshire. Like his father, the younger William went up to Christ's College, Cambridge, where he matriculated in 1759, graduating BA in 1763 as ‘senior wrangler’, meaning that his was the highest performance of all Tripos candidates in that year. After 3 years of school teaching in Greenwich, he was elected fellow of Christ’s in 1766 and ordained deacon. In 1767, he was ordained priest and graduated MA. He was awarded the Doctor of Divinity degree in 1795 for his *Evidences of Christianity* (1794), which remained on the reading list for ‘Little Go’ (Cambridge Previous Examination) until the 1920s.

For 10 years after election as fellow, Paley occupied various college offices and played a large part in teaching undergraduates. At that time, this was almost entirely conducted in the colleges by college lecturers and tutors. The few university lectures delivered by a small handful of professors were optional and scantily attended. But college classes were compulsory. All undergraduates faced a common curriculum designed to prepare the next generation of clergymen, magistrates, and legislators for their public duties in a Christian society: the Latin and Greek classics supplemented in some colleges by biblical languages and literature, and some reading in ‘moral and political philosophy’. Many undergraduates went down after 1 or 2 years of this, and most of those who remained in residence received the ordinary BA without examination, after keeping the requisite number of terms.

A small minority of ambitious students who needed to make their way in the world, and who were usually of relatively humble origins, sought an honours degree and competed in the Tripos examinations. These consisted of five public disputations in Latin, using Aristotelian logic, on theses acceptable to the Moderators. However, by the middle of the eighteenth century, the oral tests were supplemented by a written ‘Senate House Examination’ in mathematics—the first written examinations in any university of the Western world. Candidates for honours therefore supplemented their other studies with Newtonian ‘natural philosophy’ and mathematics.

Paley was soon known throughout Cambridge as a superb teacher, and many students came from other colleges to attend his lectures. A later commentator wrote of Paley’s ‘utter inability to be obscure’ (Annan 1984: 244). In all probability, Paley taught the entire curriculum with the exception of the classics, in addition to mathematics and natural philosophy for Tripos candidates in Christ’s College.

In 1776, 10 years of hard work—with the assistance of patronage—brought its reward. Paley was preferred to the rectory of Great Musgrave,
William Paley (1743–1805)

Westmorland. Thus, at last he was able to marry, resigning his fellowship as was then required. His wife, Jane Hewitt of Carlisle, bore him ten children, two of whom died in infancy. He remained in the diocese of Carlisle for the rest of his career, on terms of cordial friendship with his mentor, patron, and ecclesiastical superior, Edmund Law, Bishop of Carlisle (1768–1787), who had been a Fellow of Christ’s in the 1730s, and Master of Peterhouse and Knightsbridge Professor of Philosophy when Paley was a young man. Paley’s energy and efficiency soon led to his promotion as Archdeacon (1782) and Chancellor (1785). But he also held benefices later in the dioceses of Lincoln and Durham, and in 1796, he moved to Bishop Wearmouth in Durham whilst remaining Archdeacon of Carlisle. He was exemplary in parochial and diocesan duties, active in promoting education of the poor, and a leader in the campaign to abolish the slave trade. He also advocated tithe reform and supported independence for the American colonies. His first wife having died in 1791, he married Catherine Dobson of Carlisle in 1795. Paley died on 15 May 1805 after a lingering and painful illness, during which he completed his last book, *Natural Theology* (1802). He is buried in Carlisle Cathedral.

Paley’s daughter, Mary, was grandmother to Mary Paley (1850–1944), who was among the first five women to enter Newnham College when it opened its doors in 1875. She read for the Moral Sciences Tripos and married her economics instructor, Alfred Marshall.

Soon after leaving Cambridge, Paley was urged by his bishop and other friends to write up his college lectures for publication. He began with *Moral and Political Philosophy* (1785), a spectacular success for which his publishers paid £1000—more than Malthus was to earn from all his books in a lifetime. It was almost at once adopted as a required text for all undergraduates at Cambridge, went through 20 English editions by 1814 (15 in Paley’s own lifetime) and 10 American editions by 1821. In the USA, it remained ‘the most popular text on moral philosophy from the 1790s to the Civil War’ (Haddow 1939: 67). Though long superseded as a textbook, its sparkling lucidity still had appeal for the discriminating in the twentieth century: ‘If anyone will take up again Paley’s *Principles*, Keynes declared in 1933, ‘he will find, contrary perhaps to his expectation, an immortal book’ (Keynes 1933 [1972]: 79, fn. 2).

The first five books of *Principles* are concerned with moral philosophy: obligation and duty—to God, to our neighbour, and to ourselves. Book VI contains ‘Elements of Political Knowledge’, with chapters on government, obedience and civil liberty, the British constitution, the administration of justice, and religious and military establishments.

Since there can be no obligation to do that which is unfeasible, moral, and political philosophy must entail some positive investigation of the economic
and social circumstances to which normative principles apply. Therefore an
element of what we now call ‘economic analysis’ is always to be found, implicit
or explicit, in almost all expositions of political philosophy at least since Plato’s
Republic. What we might think of now as Paley’s ‘economic thought’ was
neither ‘political œconomy’ in the sense of either Sir James Steuart or Adam
Smith nor ‘economics’ as later conceived by his great-grandson-in-law. It is
entirely contained in the penultimate chapter of Principles, Book VI, Chap.
XI: ‘Of Population and Provision’, which, though only 1 out of 88 chapters,
is long and complex and comprises 8 % of the entire text.

What follows consists of three parts. Much of the material, especially in
the second and third parts, is adapted from Waterman (1996), some of it
verbatim.

Firstly, An examination of Paley’s method of thought: the intellectual context
of mid-eighteenth-century Cambridge in which it emerged including such
evidence as there is of economic thinking by his Cambridge contempo-
raries; his individualist, proto-utilitarian view of society; and the possible
influence of other eighteenth-century authors such as Bernard Mandeville,
David Hume, George Berkeley, Steuart, and Smith.

Secondly, A formalisation of Paley’s implicit demand-led, two-sector macro
model: the stability of its equilibrium and the possibility of comparative
statics, its generalisation of Mandeville’s Fable of the Bees, its explicit recog-
nition of what is perhaps the first example of optimisation in economic
thought; and other economic topics in ‘Population and Provision’.

Thirdly, A consideration of what may have led Keynes, writing in the early
1930s when his own economic thinking was in flux, to be so impressed by
Paley’s analysis, and to think of him as ‘the first of the Cambridge
economists’.

2 Paley’s Method of Thought

The Cambridge Context of Paley’s Economic Thought

Since Paley included some analytical treatment of economic matters in Book VI
of Principles, and since this is presumably based, like Books I–V, on his college
lectures, it seems highly probable that at least some tutors and lecturers in other
colleges did the same. A great deal of what we now recognise as ‘economic litera-
ture’, both in French and in English, was becoming available to the learned from about the middle of the eighteenth century, and it is unlikely that Cambridge dons—who were an important part of a very small intellectual elite in England at that time—would not have been aware of it. But evidence of this is hard to come by. Hints may be found here and there in correspondence between undergraduates and their parents, for example, such as that between ‘Bob’ Malthus and his father, or Philip Yorke and Lord Hardwicke (Searby 1997: 545–561). However, no one has yet attempted the immense and possibly fruitless task of collecting all surviving correspondence and extracting such information from it.

One straw in the wind has recently come to light, however. A contemporary of Paley’s, John Hey (1734–1815), like him a Yorkshire man and almost certainly a friend and fellow member of the Hyson Club (founded in 1758 by wranglers), was a fellow and tutor at Sidney Sussex College from 1758 to 1779. In 1780, he became the first Norrisian Professor of Divinity, and there is evidence that Malthus attended his university lectures in that chair. During the 1770s, Hey gave a series of college lectures on ‘morality’ for his Sidney Sussex pupils which attracted the voluntary attendance of undergraduates from other colleges including William Pitt the Younger, then (1773–1776) at Pembroke College.

In 1997, whilst conducting research for an article on Hey in the New Dictionary of National Biography, I discovered in the archives of Sidney Sussex nine bound volumes of his unpublished ‘Lectures on Morality’ which had been deposited by his brothers after his death in 1815 and which, so far as I have been able to discover, have never been looked at by anyone since. The manuscript had been intended for publication, and Volume I (p. 7) contains a ‘Preface’, written in 1814, which includes the following passage:

I do not recollect at what time D’ Paley began to read in morality at X’s College; but as we were contemporary readers, it has always seemed best to me to let our disquisitions be independent of each other. For this reason only I have abstained from reading D’ Paley’s Moral Philosophy, tho’ I have perused all his other works with attention and admiration. I have not in the least thought of setting my lucubrations in any competition with his Moral Philosophy

Hey’s Norrisian Lectures in Divinity had been highly successful and continued in use throughout the Anglophone world—including both Canada and Australia—into the 1840s. But despite repeated attempts, he could find no publisher for his Lectures in Morality: for alas, Hey’s ‘lucubrations’ were indeed in competition with those of his colleague. Moreover, after 1785 there was room only for one textbook in that field: ‘D’ Paley’s Moral Philosophy’.
It is instructive to compare Hey’s treatment of economic matters with Paley’s. Though there is an answer to Mandeville in Volume I, there is no attempt to formulate a macroeconomic model of the interdependence of ‘luxuries’ and necessities. But in Volume III, there are seven lectures on ‘permutatory contracts’ relating to the exchange of goods and services; to the nature and use of money; to buying and selling; and to the letting and hiring of persons, things, and money. Although the intention is normative and the treatment at times quasi-legal, analysis is never far below the surface.

I confess I have never in any author seen the idea of value or price made clear and satisfactory, tho’ all authors who have written on natural law, have offered explanations of it. This makes me desirous to convey my idea, by way of trying whether it will be more satisfactory. (Hey (deposited 1815): Volume III, 1325; underlining in original)

Hey suggests that the best way ‘to conceive the value of anything according to men’s general wants’ would be ‘to suppose all men bidding for it at a universal auction’. Hence ‘the value of any one thing, when x of them are saleable, is the xth part of the least sum which only x persons could be prevailed upon to give up for them all’ (ibid.) In developing this idea Hey’s exposition seems to be a possible source of the first-ever formal demand function, which was specified by Malthus (1800) 24 years later. As with Malthus, Hey seems to have had in mind a demand function of price interacting with a price-inelastic supply curve that may shift from time to time. If there was a characteristically ‘Cambridge’ way of conceiving value theory in the eighteenth century, Hey’s lectures are important evidence of it. He may even perhaps be enrolled, along with Smith and Malthus, among the pioneers of the supply-and-demand approach to value theory that ‘won out ultimately’ (Schumpeter 1954: 482) over the labour theory of value maintained by Ricardo and Marx.

The lectures in Volume III on ‘economic’ topics are variously dated from 12th to 21st November 1776, by which time Paley had quitted Cambridge for Cumberland. Neil Hitchin’s recent discovery of a student’s notes of Paley’s lectures suggests that they were delivered, possibly on several occasions between 1775 and 1776, probably in 1775 itself; and that manuscript copies of his lecture notes circulated in Cambridge after his departure (Hitchin n.d.). This evidence is consistent with Hey’s recollection that he and Paley were ‘contemporary readers’. Yet it is remarkable that there could have been so little intellectual contact (at least about their teaching) between two friends working in almost neighbouring colleges, and also that there should have been such dissimilarity in their college lectures on the same topic. Like Hey’s, Paley’s
lectures (or at any rate his book which is based on them) contain treatment of contracts: of sale, of hazard, of lending, and of labour (Paley 1785: Book III, Part I, Chaps. VI–XIV). But there is no trace of the economic analysis with which Hey informed his exposition of these topics. Paley may have been ‘the first of the Cambridge economists’, but value theory played no part whatsoever in his thinking. Hey, on the other hand, had nothing to say about anything we would now call macroeconomics.

3 Utilitarian Ethics and Methodological Individualism

In one very important respect, however, Paley and Hey were at one. The normative social theory of each was utilitarian in the original, Cambridge, sense. Utilitarian ethics seem to have originated with John Gay’s ‘Dissertation concerning the Fundamental Principle of Virtue or Morality’ published as a preface to the English translation by Paley’s patron Edmund Law (1731) of William King’s De Origine Mali (1702). Gay, who was a Fellow of Christ’s from 1724 to 1732, argued that the happiness of mankind is willed by God, and therefore that humans are obliged to act so as to maximise the happiness of their fellow creatures. This position seems to have been taken for granted in Cambridge from the mid-eighteenth century and would undoubtedly have been taught at Christ’s when Paley was an undergraduate (1759–1763)—as it had been when his father was an undergraduate during Gay’s tenure as a Fellow. Paley develops the theme in Principles, which was almost contemporaneous with Jeremy Bentham’s An Introduction to the Principles of Morals and Legislation (1789). Bentham’s utilitarianism is sometimes characterised as ‘Paley with God left out’. Paley begins his ‘economics’ chapter in Principles by declaring that ‘The final view of all rational politics is to produce the greatest quantity of happiness in a given tract of land’ (Paley ibid.: 587). In Hey’s lectures on contracts, ‘the good of mankind’ is similarly normative (e.g. Hey ibid.: Volume III, 1280–1281).

Utilitarian thinking is congruent with both political and methodological individualism. The latter was implicit in much eighteenth-century economic thought, as in Wealth of Nations in which the individual decision-maker, each independent master acting entirely for his own benefit, is the prime mover (see Arrow 1994). But Paley seems to have been the first economic thinker to make explicit the assumptions of both kinds of individualism. At the outset of ‘Population and Provision’, he states his position in a passage the first sentence of which foreshadows a somewhat similar declaration by British Prime Minister Margaret Thatcher:
[Altho’ we speak of communities as sentient beings; altho’ we ascribe to them happiness and misery, desires, interests and passions, nothing really exists or feels but individuals. The happiness of a people is made up of the happiness of single persons; and the quantity of it can only be augmented by encreasing the number of the percipients, or the pleasures of their perceptions. (Paley ibid.: 587–588; italics in original)

In one interesting respect, the penultimate clause of this affirmation is eccentric. How can ‘the happiness of a people’ possibly be ‘augmented by encreasing the number of the percipients’?

Paley assumed—subject to important qualifications—that the ‘happiness’ of each individual is rather like his weight: it could be represented as a scalar magnitude and thereby aggregated with those of others in order to get a total happiness (weight, etc.) of the relevant social unit: ‘[T]he collective happiness will be nearly in the exact proportion of the numbers, that is, twice the number of inhabitants will produce double the quantity of happiness’ (ibid.: 588). Moreover, although this only holds true in ‘adjoining periods, in the same country’, in general ‘it may, and ought to be assumed in all political deliberations, that a larger portion of happiness is enjoyed among ten persons, possessing the means of healthy subsistence, than can be produced by five persons, under every advantage of power, affluence and luxury’ (ibid.: 588–589).

In effect, Paley has implicitly formulated the first social welfare function: ‘collective happiness’ \( U = U(N) \), where \( N \) is population and \( U' > 0 \). In the macroeconomic analysis which occupies much of the rest of his ‘economics’ chapter, maximisation of population is the policy goal. It is essential to distinguish Paley’s reasons for this from those of the ‘political economists’ of the seventeenth and eighteenth centuries for whom the maximisation of population was likewise a policy goal. Political economists from Antoine de Montchrétien to Steuart sought to increase the wealth and military power of the nation state. Population was merely instrumental: more bodies meant lower wages and larger armies. Their normative criterion was the welfare of \( le roi soleil \) and other heads of state. Paley was radically ‘modern’ in identifying the welfare of individuals, rather than that of the sovereign, as the proper object of public policy: ‘The riches, strength, and glory of nations… have no value farther than as they contribute to…the happiness of a people’ (ibid.: 587).
4 Other Possible Influences on Paley’s Economic Thought

By the third quarter of the eighteenth century, a great deal of what become ‘political economy’ in the nineteenth century and ‘economics’ in the twentieth had begun to circulate in informed circles in France, Italy, Scotland, and England, and the outlines of a common body of knowledge can be identified:

(a) Agriculture normally affords more food than is necessary to feed those who produce it.

(b) The cost of production—of food as of all other commodities—will not normally be incurred unless there is an expectation of an adequate return: ‘effectual demand’ is thus a necessary condition of production.

(c) Since manufactured goods need inputs from agriculture (food to sustain manufacturers), an urban manufacturing sector can provide a demand for the agricultural surplus.

(d) In the same way, a rural agricultural sector can provide demand for a manufacturing surplus, hence the two sectors are mutually sustaining.

(e) Labour needed in production is produced by human beings supplied with food (and manufactured necessities).

(f) A certain per capita average of food and other necessities will keep population and work force stationary. At higher income than this, these will grow and vice versa.

Proposition (f), sometimes thought of as ‘Malthusian’ but actually commonplace among all eighteenth-century authors, is at the centre of Smith’s theory of wages (Smith 1776 [1976]: Book I, Chap. viii, 39). Propositions (c), (d), and (f) are classically illustrated in Smith’s (ibid., Book III, Chap. i) ‘Of the Natural Progress of Opulence’, which describes and discusses the standard eighteenth-century, two-sector general equilibrium model of the interdependence of ‘town’ and ‘country’ (Waterman 2001). Proposition (b) was noted by the Physiocrats among others, and proposition (a) seems to have been take for granted by all. Though it is evident that Paley was familiar with these ideas and indeed made them the focus of his own analysis, he gave us no help in discovering his sources.

In addition to this common core associated in particular with Mandeville, Richard Cantillon, François Quesnay, and Smith, Paley is also seemingly aware
of many other elements of eighteenth-century economic thought to be found in John Locke, Hume, Berkeley, Steuart, and Josiah Tucker. Paley’s treatment of money, for example, like Hey’s (ibid.: Volume III: 1335–5), seems obviously to depend on Hume: but whereas Hey acknowledged this source, Paley did not. Paley’s understanding of the effects of technical progress (Paley 1785: 629–631) as also his ranking of export industries by labour intensity (ibid.: 612–614) may have come from Steuart. Yet only Berkeley’s ‘walls of brass, fifty cubits high’ appear with attribution (as they do in Malthus). What Paley seems not to know about, or at any rate not to think important enough to teach his undergraduates, are: (a) price theory as found incipiently in Smith, (b) general equilibrium in competitive markets as pioneered by Pierre Le Pesant, sieur de Boisguilbert, and (c) the virtues of laissez-faire as taught by the Physiocrats. The last is in marked contrast to his somewhat older (Oxonian) contemporary, the Revd Josiah Tucker (1713–1799), whose praise of the self-regulating market economy was later echoed by Smith.

Although Paley’s lectures were delivered at the latest 1 year before the appearance of Wealth of Nations in March 1776 (the year he left Cambridge), the occurrence of certain passages in Principles which read like summaries of Smith’s work suggests the possibility that Paley did read it sometime between 1776 and 1785, and incorporated some of its ideas in his revision. For example, Paley’s remark that population may double in 20 years (Paley ibid.: 590) resembles that in Smith (1776 [1976]: Book I, Chap. viii, 23) where the period is 25 years. His account of money, property, and power (ibid.: 604) could be a digest of a similar argument in Smith. Smith’s famous trio, ‘the butcher, baker, brewer’ crops up in Paley, as does the assumption that ‘the only spring which keeps human labour in motion’ is ‘the exclusive right to the produce’ (ibid.: 606, 602). However, any conclusion on the basis of such evidence can only be conjectural, for Paley explicitly declined to acknowledge his sources:

I have scarcely ever referred to any other book, or mentioned the name of the author whose thoughts, and sometimes, possibly, whose very expressions, I have adopted. My method of writing has constantly been this; to extract what I could from my own stores and my own reflections in the first place; to put down that; and afterwards to consult upon each subject such readings as fell in my way: which order, I am convinced, is the only one whereby any person can keep his thought from sliding into other men’s trains. (ibid.: xi)

As Paul Samuelson (1946: 197) said of Lord Keynes: ‘[H]is was one of those original minds which never accepts a thing as true and important unless he has already thought it through for himself.’
5 Economic Analysis in ‘Of Population and Provision’

The Interdependence of ‘Provisions’ and ‘Luxuries’

At the centre of Paley’s argument in ‘Of Population and Provision’ is a clearly thought-out account of the interdependence of production, employment, and population between a rural sector supplying ‘provisions’ and an urban sector (‘flourishing cities…populous towns’ (Paley 1785: 609) supplying ‘luxuries’).

It appears…that the business of one half of mankind is, to set the other half at work; that is to provide articles, which, by tempting the desires, may stimulate the industry, and call forth the activity of those, upon the exertion of whose industry, and the application of whose faculties, the production of human provision depends. (ibid.)

If a stable equilibrium exists in this system of mutual causation, total population and therefore ‘collective happiness’ may be determined. We can examine this possibility by means of a formal reconstruction of Paley’s text.

Suppose an annual amount of ‘provisions’, $P$, is produced by the employment of $A$ units of agricultural labour only. Suppose the annual food requirement of each worker is $p$, a constant of nature. ‘Since the soil will maintain many more than it can employ’ (ibid.: 608), $A$ units of agricultural labour can only be employed if there is an effectual demand for provisions, $P^D$, which exceeds food producers’ own consumption by the amount $(P - pA)$. In a closed economy without government this can come from only two sources: the expenditure on food by workers in other sectors, and the expenditure upon food by landlords for their own and their dependents’ (servants’, retainers’, etc.) consumption.

It is therefore evident that annual production and employment in agriculture can only be sustained if non-agricultural workers and landlords receive and spend the appropriate amounts: ‘The plenty of provisions produced…affords subsistence to individuals only in proportion as it is distributed. Now there is but one principle of distribution that can ever become universal, namely the principle of “exchange”’ (ibid.: 604; italics in original). Hence ‘the sale of provisions depends upon the number…of those who have the fruits of some other kind of industry to tender in exchange’ (ibid.: 605–607). Following Paley, who clearly had Mandeville in mind at this point (ibid.: 596; cf. Mandeville (1732 [1988]: Book I, 107–123) we may group all non-provisions as ‘luxury’ goods.

Suppose an annual quantity of ‘luxury’ goods, $Q$, is produced by the employment of $L$ units of manufacturing labour only. Suppose the annual
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food requirement of workers in the manufacturing sector, as in agriculture, is
and the per capita demand for ‘luxury’ goods in each sector is \( q \). Quantities
of \( P \) goods are measured in bushels of ‘corn’ per annum, and of \( Q \) goods in
yards of ‘cloth’ per annum. Paley had no explicit theory of production and
treated output as demand-determined: ‘the quantity of provision...will evi-
dently be regulated by the demand’ (Paley ibid.: 605; my italics). He recognised
that both ‘the husbandman’ and ‘the landowner’ are ‘entitled to [some share
of] the produce of the soil’ (ibid.: 609, 610), but he had no theory of rent.
We must therefore suppose that rent, \( R \) (measured in ‘corn’), is exogenously
determined and may treat it as a parameter. Landlords might well spend some
of this on the output of the ‘luxury’ goods sector. But to keep the model as
simple as possible it will be assumed that all rents are spent on personal ser-
vice, that all menial servants spend their wages on provisions only, and that
\( Q \) goods are bought by workers only. The essential ingredients of Paley’s two-
sector model of reciprocal demand may therefore be stated as

\[
P^D = pA + pL + R \\
Q^D = qA + qL
\]  

where \( Q^D \) is the quantity of ‘luxury’ goods produced.

It is evident that the amounts of employment in the two sectors, \( A \) and
\( L \), are the key variables. Also, it is equally evident that \( Q \) goods will only
be produced if the agricultural sector provides the provisions which \( L \) work-
ers require. Paley called agricultural labour *productive*, manufacturing labour
*instrumental*, but judged ‘both equally necessary, though the one have no
other object than to excite the other’ (ibid.: 609).

The question is, what determines employment in each sector? This is not
a question Paley was, or could have been, equipped to answer. What follows
next therefore is a ‘rational reconstruction’ of his text: not what Paley actually
said but what he might have said had he enjoyed the advantages of reading
‘Economics’ in present-day Cambridge. Rational reconstruction is not his-
tory: but in my opinion, which I have defended elsewhere (Waterman 2003),
it can be a useful tool of history.

It is evident that for Paley, employment is an increasing function of the
demand for labour, which in turn depends upon the demand for goods.
However, it must also depend upon the supply of labour. Paley argued that
the supply of labour is a decreasing function of the propensity of workers in
each sector to desire ‘luxury’. In a remarkable passage, which is almost cer-
tainly the chief source of Malthus’s concept of the ‘preventive check’, Paley
noted that ‘men will not marry, to sink their place or condition in society’ (ibid.: 596; italics in original; cf. Malthus (1798: 64ff.). Hence an increase in ‘luxury’ which renders ‘the usual accommodations of life more expensive’ and raises the cost of ‘the established mode of living’, deters marriage and family formation so tending to reduce population and work force (ibid.: 596).

We may therefore take \( q \) as an index of the prevailing degree of ‘luxury’ and suppose that an increase in \( q \) (other things being equal) would reduce the supply of labour. Since an increase in \( P^D \) and \( Q^D \) (other things being equal) would increase demand for labour, we may write sectoral employment as

\[
A = A(P^D, q), A_p > 0, A_q < 0, \tag{10.3}
\]

\[
L = L(Q^D, q), L_q > 0, L_q < 0. \tag{10.4}
\]

When product demand is satisfied in each sector, we may equate \( P^D \) with \( P \) and \( Q^D \) with \( Q \) and represent Paley’s story of the interdependence of provisions and ‘luxury’ goods as

\[
P = p_A(P, q) + p_L(Q, q) + R \tag{10.5}
\]

\[
Q = q_A(P, q) + q_L(Q, q), \tag{10.6}
\]

two simultaneous equations in \( P \) and \( Q \) for given values of the constant of nature, \( p \), the behavioural parameter, \( q \), and the exogenous variable, \( R \).

Let the \( A \) and \( L \) functions be represented in linear form as

\[
A = uP + vq \tag{10.7}
\]

\[
L = wQ + xq, \tag{10.8}
\]

respectively, where \( u > 0, v < 0, w > 0 \) and \( x < 0 \). Let \( v + x = y \), which of course is negative. Then

\[
P = \alpha + \beta Q \tag{10.9}
\]

\[
Q = \gamma + \delta P \tag{10.10}
\]

where

\[
\alpha = \frac{pyq + R}{1 - pu}, \beta = \frac{pw}{1 - pu}, \gamma = \frac{yq^2}{1 - qw}, \text{ and } \delta = \frac{qu}{1 - qw}
\]

The simultaneous determination at equilibrium of provisions and ‘luxury’ goods is shown in Fig. 10.1, in which the curve labelled \( P(Q) \) plots Eq. (10.7) and \( Q(P) \) plots Eq. (10.8). The requirement that \( v \) be steeper than \( P(Q) \) is satisfied by the stability condition of the model (see Appendix A).
Given Paley’s social welfare function, ‘rational politics’ must seek to maximise population $N$, where $N = P/p$ at equilibrium. Therefore, $P$ must be maximised given the biological food requirement, $p$. In terms of Fig. 10.1, this amounts to action which may increase the intercept $\alpha$, and/or increase the slope $\beta$, and/or increase the (negative) intercept $\gamma$, and/or increase the cotangent $\delta$. Since $p$ is biologically determined, we are left with $R$, with the two technical parameters $u$ and $w$ (which may be regarded as reciprocals of the marginal product of labour in each sector), and the two behavioural parameters $y$ and $q$, the first of which measures the (long-run) response of population and labour supply to a rise in customary living standards, the second of which is the degree of expected and desired ‘luxury’.

It is clear from Fig. 10.1 that an increase in $R$ increases $\alpha$ and hence both $P$ and $Q$ at equilibrium. This is because the greater are rents, other things being equal, the greater the demand for provisions and hence the greater the employment of agricultural workers. Paley argued strongly for private property in land, and for social arrangements which gave incentives to landlords to farm, or at least oversee the farming of their own land, so as to maximise rent (ibid.: 601–603, 633–636).

Paley considered the effects of ‘abridgement of labour’ by ‘mechanical contrivances’ upon employment and population (ibid.: 629–631). Though the immediate effect may be technological unemployment, ‘some more general and remoter consequences’ may ‘increase the demand for work’ hence ‘the quantity of employment, upon the whole, will gain an addition’ (ibid.: 630). Technical progress in agriculture reduces $u$ which lowers $\alpha$, $\beta$, and $\delta$, and in ‘luxury’ goods

![Fig. 10.1](image-url)  The mutual determination of provisions and ‘luxury’ goods
reduces \( w \) which lowers \( \beta, \gamma, \) and \( \delta \). Figure 10.1 therefore captures the initial, technological unemployment, but not the subsequent expansion. This is because the latter depends upon an increase in workers’ incomes, so raising \( \alpha \), the effect of which I have not allowed for in Eqs. (10.7) and (10.8). For similar reasons the diagram is not able to illustrate Paley’s analysis—obviously derived from Hume (1752 [1994]: 118–120)—of the effect of a ‘continual increase’ in the money supply, which keeps wages high while it lasts (Paley ibid.: 619–621).

### The Generalisation of Mandeville and Optimisation

Figure 10.1 is of the most use in illustrating the effect of changes in the two behavioural parameters, \( y \) and \( q \). When the supply of labour is independent of the degree of ‘luxury’, \( y \) is zero and so therefore is \( \gamma \) and \( \alpha \) is simply \( R/(1 - pu) \). For given values of \( u, w, \) and \( \alpha \), the outputs \( P \) and \( Q \) are as large as possible. The effect of an increase in ‘luxury’ in these circumstances is unambiguous. \( \delta \) increases and \( Q(P) \) rotates clockwise about the origin, determining a higher equilibrium of \( P \) and \( Q \). This case is pure Mandeville 1732 [1988]: Book I, 34, 35). The greater the degree of ‘luxury’, the greater total production, income, and population. But should Jove convert the bees from ‘vice’ and turn them to a virtuous frugality, their hive collapses:

As Pride and Luxury decrease…
All Arts and Crafts neglected lie;
Content, the Bane of Industry…
So few in the vast Hive remain,
The hundredth Part they can’t maintain…

For as \( q \) (and \( \delta \)) decline, \( Q(P) \) rotates anti-clockwise until it lies along the vertical axis. National product falls to the bare minimum of a subsistence, agricultural economy: \( P = \alpha = R/(1 - pu), \) and \( Q = 0 \).

Paley was deeply aware of the importance of ‘luxury’ in stimulating employment and industry, and thereby farm production and population: ‘The watchmaker, while he polishes the case, or files the wheels of his machine, is contributing to the production of corn as effectually, though not so directly, as if he handled the spade or held the plough’ (Paley ibid.: 610). He discussed the stimulating effect upon agriculture of trade with large urban centres in a passage which resembles the treatment by Smith (ibid.: 610–612; cf. Smith 1776 [1976]: Book III, Chap. i) and may owe something to Hume (1752 [1994]: 98–99). But as I have noted above, Paley was also aware—as Mandeville most certainly was not—that the
effect of ‘luxury’ upon production and population cuts two ways. On the one
hand, indeed it stimulates demand, production, and population, but on the other,
by tending to reduce the supply of labour, it has the opposite effect. This is appar-
ent from Fig. 10.1. An increase in $q$ causes $Q(P)$ to rotate clockwise which by itself
would increase output. However, it also causes $P(Q)$ to shift downwards and $Q(P)$
to shift to the left, which by themselves would reduce output.

It appears, then, that luxury, considered with a view to population, acts by two
opposite effects and it seems probable that there exists a point in the scale to
which luxury may ascend...beyond which the prejudicial consequences begin
to preponderate. The determination of this point, though it assume the form of
an arithmetical problem, depends upon circumstances too numerous, intricate
and undefined, to admit of a precise solution. (Paley ibid.: 597–598)

Though no ‘arithmetical’ determination of optimum $q = q^*$ is available, a
merely algebraic one may be had. For as Paley’s intellectual grandson Robert
Malthus noted 20 years later, ‘many of the questions, both in morals and in poli-
tics, seem to be of the nature of the problems de maximis and minimis in fluxions;
in which there is always a point where a certain effect is the greatest, while on
either side of this point it gradually diminishes’ (Malthus 1814 [1986]: 102). By
means of elementary ‘fluxions’, we may differentiate $P$ with respect to $q$, and so
solve for $q^*$ from the first-order conditions for a maximum of $P$ (Appendix B).

6 In What ‘Sense’ Was Paley ‘The First
of the Cambridge Economists’?

Paley’s Putative Influence on Malthus

Keynes set forth his conjecture in his biographical essay on Malthus, written
at a time when his own thinking seems to have been excited and perhaps dra-
stically changed by his Malthusian studies (Kates 1994). Moreover, it is evi-
dent that some of Malthus’s most ‘Malthusian’ ideas are to be found in Paley’s
Principles—although to be sure some are also to be discovered in Wealth of
Nations, which Malthus (alone among Cambridge men of his generation)
probably knew at least as well as Principles.

Paley’s brief exposition (1785: 589–6) contains virtually the whole of
Malthus’s population theory, narrowly considered, including strong hints of
Malthus’s own phraseology: Nature has provided for ‘an indefinite multipli-
cation’ of the human, as of all other species. Under favourable conditions,
human populations double in 20 (not 25) years. There is a ‘tendency’ to
continual increase, but this is countered by ‘checks’ to population, provided males do not indulge in ‘irregular gratifications’. Marriage is the chief cause of population, but ‘men will not marry’ unless they can expect ‘that mode of subsistence to which each class…is accustomed’. Finally, when living standards rise and remain high for long enough, there is a ratchet effect upon the socially determined ‘subsistence’ requirement, for ‘habitual superfluities become actual wants’. Other Malthusian ideas, such as the quasi-Physiocratic emphasis on the strategic importance of agriculture (ibid.: 611–612, 633–636) are also to be found. We need not infer from any of this that Malthus was a “master in plagiarism” (Marx 1954: Book I, 475, fn. 1). As we have seen from Paley’s own example, the unacknowledged use of other, well-known authors was quite acceptable in eighteenth-century Cambridge.

What is lacking in Paley, however, is Malthus’s production theory, which, as many have noted, is implicit in, perhaps derived from, the famous ‘ratios’ of food and population increase: specifically the much-derided ‘arithmetical’ ratio (see Waterman 1992). From that seed grew diminishing returns to labour (and capital) in agricultural production, the ‘Ricardian’ doctrine of rent, and the ‘canonical classical model’ (Samuelson 1978). Now, in all versions of ‘classical’ and ‘pre-classical’ political economy, population is constrained by the available food supply. But in the ‘canonical’ tradition, the production of food is governed by diminishing marginal product of the variable ‘labor-cum-capital’ factor applied to a given vector of lands of differing fertility. With competitive factor and product markets, profit-maximising ‘cultivators’ employ capital and labour up to the point at which (composite) marginal product equals (joint) factor payment. In stationary equilibrium, the variable factor return is that at which the growth rates of capital and labour are zero. Employment, production, and population are arrested well short of the ecological maximum, and rent is maximised for given ‘subsistence’ rates of factor payment and the state of technique. Implicit in this account is the assumption that demand for food will always be sufficient to justify cultivators in employing and producing at profit-maximising equilibrium. What this means is that an increase of ‘luxury’, interpreted as that component of the socially determined ‘subsistence’ wage in excess of biological requirements, has only one effect, which is to reduce the equilibrium levels of production and employment.

Malthus and Archbishop of Canterbury John Bird Sumner, a keen supporter of Malthus’s population theory, based their programme for the ‘improvement’ of the lower orders upon this understanding. Only the prudential check, theologically sanctioned as ‘moral restraint’, could permanently raise both real incomes and relative share of the poor. Thomas Chalmers (1808, 1832), who articulated the sectoral structure of the ‘canonical’ model more fully than any other (see Waterman 1991), was obsessed by this point.
Also, on the social importance of population control, Ricardo, James Mill, and the other ‘Philosophical Radicals’ were wholly at one with Malthus and ‘Christian Political Economy’.

For Malthus and classical economics generally, an increase in ‘luxury’ tends to decrease population. For Mandeville, as we have seen, it tends to increase population. Paley is unique in his attempt to recognise both these effects, and perhaps the first-ever economic analyst to consider the problem of optimisation.

**A Proto-Keynesian Paley?**

Paley could get the best of both worlds, however, because he ignored scarcity. Given $q$, the degree of luxury, the outputs of provisions and ‘luxury’ goods, and the levels of employment and population are all determined by the exogenous components of demand in either sector. (In my version, there is only $R$, but the point is general.) There is no land scarcity in Paley, no diminishing returns, no opportunity costs, no relative prices, and no problem of resource allocation. Though a market-clearing exchange rate ($r = qA/pL$) must exist between provisions and ‘luxury’ goods, it is never mentioned. There is no consideration of economic growth. None of the analytical concerns of classical political economy appear: not even those which are adumbrated in Hey’s lectures. Strictly speaking, Paley’s economic thought is not really ‘economics’ at all: not at least in any way that could interest Smith and his successors. I wish to suggest that it is in this second, methodological sense, as much as the first, historical sense, that Keynes may have regarded Paley as ‘the first of the Cambridge [or at any rate, “Keynesian”] economists’.

This is illustrated—not to say caricatured—by the model set out on Fig. 10.1: which is, of course, isomorphic with Romney Robinson’s (1952) analysis of the interdependence of national incomes in a two-country, ‘Keynesian’ (i.e. underemployed, fixed price) world. Robinson’s model may well be the high-water mark of ‘crude Keynesian’ macroeconomics. All supply curves are horizontal, interest and prices are irrelevant, and the only thing that matters is aggregate demand.

Obviously, there are some fundamental differences between Paley’s and Robinson’s conceptions of the economy, leaving aside (as we may) the fact that the former deals with one country, the latter with the world. In Robinson’s model, demand determines supply in the (Marshallian) short period because a given population, workforce, and capital stock are massively underemployed.
and all prices are stationary or sluggish. If prices adjusted rapidly, or if full employment were approached, his story would change drastically. In Paley’s model, demand determines supply in the (Malthusian) long period because population, and fully employed workforce, is perfectly elastic at the socially determined subsistence wage.

However, what they have in common is precisely what distinguished Keynes’s vision of the economy (during a period from the Michaelmas Term of 1932 to sometime after 1936) from that of all his other predecessors, including Malthus. For although Malthus insisted on the importance of ‘effective demand’ in his controversy with Ricardo, and attempted to make analytical use of the concept in his Principles (1820, 1836) [1989], and though it may well be true, as Steven Kates (1994) has persuasively argued, that Keynes actually got his central idea as a consequence of reading the Malthus–Ricardo correspondence in late 1932, the fact remains that Malthus’s model of the economy—inasmuch as there is any such thing—is more than merely demand driven. From one standpoint no doubt, the whole of Chap. VII of Principles (Malthus ibid.: Book I, 345–373) may be regarded as a vast elaboration of Fig. 10.1. But its exposition is fatally flawed. Land scarcity and diminishing returns are recognised, but they are not integrated with ‘effective demand’ into a coherent model, and at one point, Malthus actually enounces a theorem which is seriously at variance with the predictions of Paley’s purely demand driven model (see Waterman 1996: 685–686). Indeed, so ‘classical’ does Malthus frequently appear in Principles that one eminent, present-day economist—presumably unaware of Paley’s demand theory which lies behind portions of this work—has declared that ‘Malthus is not so much an underconsumptionist as a supply-sider’ (Negishi 1989: 152).

Of course, there is more to ‘the economics of John Maynard Keynes’ than mere ‘Keynesian economics’ in Samuelson’s elementary textbook sense. But insofar as the latter may genuinely be discovered in some parts of the General Theory, its relentless concentration on the causal nature of aggregate demand has more in common with Paley’s bold reductionism than with Malthus’s conscientious but flawed attempt to do justice to the whole of economic reality. This may possibly have occurred to Keynes when he added the footnote on Paley to his rewritten Malthus essay in the autumn of 1932.
Appendices

Appendix A: Stability of Equilibrium

Let out-of-equilibrium quantity adjustment be specified as

\[ \frac{dP}{dt} = h(P^D - P); \quad h > 0 \]  \hspace{1cm} (10.9)

\[ \frac{dQ}{dt} = j(Q^D - Q); \quad j > 0 \]  \hspace{1cm} (10.10)

Then by substitution of the linear versions of Eqs. (10.1) and (10.2) for \( P^D \) and \( Q^D \) and rearrangement we obtain

\[
\begin{bmatrix}
\frac{dP}{dt} \\
\frac{dQ}{dt}
\end{bmatrix} =
\begin{bmatrix}
h(1 - pu) & hw \\
j qu & j(1 - qw)
\end{bmatrix}
\begin{bmatrix}
P \\
Q
\end{bmatrix} -
\begin{bmatrix}
h(pu + qu + R) \\
- jyq^2
\end{bmatrix} \hspace{1cm} (10.11)
\]

Or simply

\[ \frac{dV}{dr} = J.V - C. \]  \hspace{1cm} (10.12)

Now \( Det \, J = hj(1 - pu - qw) \), and \( Tr \, J = -h(1 - pu) - j(1 - qw) \).

Thus \( (Tr \, J)^2 - 4(Det \, J) = \left[ h(1 - pu) - j(1 - qw) \right]^2 > 0 \). \hspace{1cm} (10.13)

Therefore the roots are real and distinct, hence the time paths of \( P(t) \) and \( Q(t) \) out of equilibrium will be non-oscillatory. Also, if \( Det \, J > 0 \) and \( Tr \, J < 0 \), the system will be stable. It can be seen from these inequalities that the necessary and sufficient condition for stability is simply that

\[ (1 - pu - qw) > 0. \]  \hspace{1cm} (10.14)

The graphical requirement, in Fig. 10.1, that the slope of \( Q(P) \) should be steeper than that of \( P(Q) \), is evidently equivalent to satisfaction of the inequality

\[ (1 - qw) / qu > pw / (1 - pu), \]  \hspace{1cm} (10.15)

which reduces to inequality (10.13).
Appendix B: Optimisation

At equilibrium \( \frac{dV}{dt} = 0 \), hence we have the matrix equation \( J \cdot V = C \), from which we may obtain \( P_q \) by partial differentiation with respect to \( q \) and the use of Cramer’s rule. The first-order condition for a maximum of \( P \) is that \( P_q = 0 \), from which we may solve for \( q^* \), ‘that point in the scale to which luxury may ascend…with advantage to the community, and beyond which the prejudicial consequences begin to preponderate’ (Paley 1785: 597).

Since

\[
P_q = (\text{Det } J)^{-1} \cdot h_j[p_y + pywq + pw(uP + wQ)]
\]

(10.16)

and since \( \text{Det } J > 0 \) for stability, the condition \( P_q = 0 \) permits the solution.

\[
q^* = (yw)^{-1} \cdot [-y - w(uP + wQ)].
\]

(10.17)

Since \( y \) is negative and all other variables positive, \( q^* > 0 \) as \( (uP + wQ)/(-y) > w^{-1} \), the latter is interpreted as the marginal and average productivity of labour in the ‘luxury’ goods sector. It may be seen that if the marginal responsiveness of employment to ‘luxury’ were very small and approached zero, \( q^* \) would approach infinity, signifying that there is no limit to the degree to which ‘luxury may ascend…with advantage to the community’: which is Mandeville’s special case.

References

Main Works by William Paley

Paley, W. 1785. The principles of moral and political philosophy. London: Faulder. 694

(Although there were many subsequent editions of this work both before and after Edmund Paley’s Complete works of William Paley, DD (1825), there was never any change in the original text after 1785. A scholarly edition has lately been produced by the Liberty Fund, edited with a foreword by D.L. Le Mahieu [Indianapolis: Liberty Fund, 2002]. References in this chapter are to the first edition, a copy of which is in my possession).
Other Works Referred to


# Author Queries

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