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LEARNING BY DOING AMONG VICTORIAN FARMWORKERS: A CASE STUDY IN THE BIOLOGICAL AND COGNITIVE FOUNDATIONS OF SKILL ACQUISITION

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Learning by Doing among Victorian Farmworkers: A case study in the Biological and Cognitive Foundations of Skill Acquisition

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"In the Sweat of Thy Face Shalt Thou Eat Bread"

Genesis, Chap.3.

The passage from Genesis cited above points to a fundamental ambiguity in how menial labor is commonly viewed. On the one hand, the passage refers to sweat, implying the use of energies that are brutish in nature. On the other hand, the sweat does come from the face (indeed, one common rendering of this passage is , "By the sweat of thy brow"), alluding to the role of intelligence as central to how humans have obtained sustenance since the Garden of Eden.[1]

Economists and economic historians have taken a variety of positions on the role of brain versus brawn in common labouring activities. Some writers have explicitly suggested that common labor involves little more than animal energy. Alfred Marshall was explicit on the brutishness of much common labor: "In many occupations industrial efficiency requires little else than physical vigour; that is muscular strength, a good constitution and energetics." And Marshall states in a note, "In backward countries, particularly where there is not much use of horses or other draught animals, a great part of men's and women's work may be measured fairly well by the muscular exertion involved in it."[2] However, other writers have clearly assigned a role to distinctively human intelligence in even the most menial of tasks. Mill stated in his *Principles*, "All human exertion is compounded of some mental and some bodily

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[1]For an intellectual history of the terms labor and work and a number of the key ambiguities involved in these terms see Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1958), Chaps. III and IV.

[2] Marshall, Prin. of Econ, Book IV, Chap. V, &1 (variorum edition), pp.193, 194. A similar view is put forward by Simon Newcomb in his *Principles of Political Economy*, pp.103-104). Maurice Dobb in his *Wages* states (p.158) " little more than a modicum of physical strength is required to work as a docker or a navvy." An emphasis on the lack of intelligence involved in common labour would also seem to be implied in the distinction put forward by William Petty in the Seventeenth Century between art and simple labour. See E.A.J. Johnson, *Predecessors of Adam Smith*, (New York: Prentice Hall, 1937) pp.257, 270.

elements. The stupidest human, who repeats from day to day the mechanical act of climbing a ladder, performs a function partly intellectual; so much so, indeed, that the most intelligent dog or elephant could not, probably, be taught to do it. The dullest human being, instructed beforehand, is capable of turning a mill; but a horse cannot turn it without somebody to drive and to watch him."[3] Similar views are evident in the Marxist tradition.[4]

In actuality, the relative importance of brute force exertion versus mental capability in common labor has probably varied considerably. This variation has probably been influenced, among other factors, by the relative price of animal and inanimate energy sources versus human energy sources, the ability to efficiently use non-human energy sources, as well as the price placed on human mental capabilities. Nevertheless, there are considerations which create a presumption in favor of the active use of human intelligence. First, it appears that at relative factor prices that have most commonly prevailed, the human animal is a relatively inefficient means of energy conversion. J.C. Morton, an influential writer on agricultural practice in Victorian England, calculated that at prevailing prices in late nineteenth century England, it would cost 3 pence per hour to use one steam engine to lift 33,000 pounds one foot per minute while it would require 66 men to accomplish the same task and at an hourly cost of 15 shillings. Morton also estimated that at a cost of 5 pence per hour, a horse could lift 16,000 to 19,000 pounds one foot per minute, while it would require 32 men to

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[3]J.S. Mill, *Principles of Political Economy*, Ashley ed., pp.40-41.

[4]See Marx, *Capital*, vol. I, pp.177, 361, 420-27; Frederick Engels, "The Part Played by Labour in the Transition from Ape to Man," reprinted in Karl Marx and Frederick Engels, *Selected Works*, vol. II, (Moscow: Foreign Languages Publishing House, 1951), pp.74-85; Harry Braverman, *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century* (New York: Monthly Review Press, 1974), chap.1.

accomplish the same task and at an hourly cost of 8 shillings.[5] More general assessments of the inefficiency of human labor compared with animal and inanimate sources of energy have been made by Cipolla and Landes.[6] Although it has been argued that in Ancient Roman agriculture, the lack of efficient techniques for harnessing draught animals implied that humans were often regarded as more efficient than animals as prime-movers, this circumstance appears to have been far less common in the recent past.[7]

Second, one reason why one would expect the human animal to be a relatively inefficient source of energy conversion is the high biological price the human species pays for its mental capacities. The large size of the human brain at birth tends to make birth much more difficult for humans than it does for other species. And to reach its adult size the human brain must increase more than three times its size at birth. In comparison, brain size typically doubles between birth and adulthood for other large primates. This implies a longer period of childhood and dependency for humans in comparison with other primates.[8]

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[5]See John Chalmers Morton, *Labour on the Farm* (London: Bradbury, Agnew, & Co., 1887), pp.72-73.

[6]See Carlo Cipolla, *The Economic History of World Population* (Harmondsworth, Middlesex: Penguin Books, 1970), Fifth Edition, chap. 2; David Landes, *The Unbound Prometheus* (Cambridge: Cambridge University Press, 1972), pp.96-97; Also see Singer, Hist. of Technology.

[7]See R.J. Forbes, "Power," Chap. 17 in *A History of Technology*, edited by Charles Singer et al. (New York: Oxford University Press, 1956), Vol. II, pp. 590-593. Also see Fernand Braudel, *The Structures of Everyday Life. Civilization & Capitalism 15th - 18th Century, Volume I* (New York: Harper & Row, 1981), pp.336-339.

[8]See Richard Leakey and Roger Lewin, *Origins Reconsidered: In Search of What Makes Us Human* (New York: Doubleday, 1992), pp.160-161.

Furthermore, although the brain constitutes only about 2 percent of the weight of the body, it consumes almost 20 percent of the body's output of energy.[9] That a given feature has emerged through past evolution does not necessarily imply its continued importance for all members of a species. Yet the fact that mental capabilities are not only regarded as distinctively human traits, but that such a large biological price is paid for these traits would seem to create a presumption of widespread use, even for common laboring tasks.

The central role of cognition in human nature provides a foundation for presuming at least some development of skill among most of an adult population. Cognitive processes, according to a growing body of scientific work are by their cellular and even molecular nature "path dependent," to use a phrase currently fashionable among economic historians. In particular, in the nervous system, a given path of neuronal firings at one point in time tends to lower the molecular resistance and increase the tendency for subsequent neuronal firings along a similar path.[10] This tendency in turn provides a foundation for the view that cumulative life experience constitutes a major determinant in the development of cognitive capabilities. The key principle at work is what has been labelled the "association of ideas." One concise account of this principle is as follows:

> The Principle has two aspects: 1) that complex mental phenomena are formed from simple elements derived ultimately from sensations and 2) that the mechanism by which these are formed depends on similarity and/or repeated juxtaposition of the simple elements in space and time.

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[9]Ibid., p. 165.

[10]For a survey of this work see Eric R. Kandel and Robert D. Hawkins, "The Biological Basis of Learning and Individuality," *Scientific American* Vol. 267, No. 3 (Sept., 1992): 79-86. In the same issue, also see Carla J. Shatz, "The Developing Brain," pp.61-67.

> The association of ideas provides a mechanism for *ordered change through experience*.... (emphasis in original).[11]

The principle of the association of ideas was central underpinning of seventeenth and eighteenth century British empirical philosophy and especially the work of John Locke and David Hume.

The association of ideas can in turn be used to formulate what can be labelled an developmental or environmental perspective on labor force skill development. According to this perspective, work proficiency, in other words skills and capabilities, develop even in the absence of formal training programs whether by schooling, apprenticeship or other means. This in turn points to a role for life experiences of all sorts, whether formal schooling, work experiences, and even childhood and non-work experiences, in the development of workplace capabilities.

The general principle of the association of ideas and its particular application to workforce skill development is also evident in the work of Adam Smith. For example, in chapter 2 of Book I (pp.28-29) of *The Wealth of Nations*, Smith states, "The difference between the most dissimilar characters, between a philosopher and a common street porter, for example, seems to arise not so much from nature, as from habit, custom, and education." The direct influence of the work-place environment on worker characteristics above and beyond any intention of training by the employer is also emphasized by Smith, when he states in *The Wealth of Nations* that "the understandings of the greater part of men are necessarily formed by their ordinary employments." [12]

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[11]Robert M. Young, "Association of Ideas," in *Dictionary of the History of Ideas*, vol. I (New York: Charles Scribners Sons, 1973), p.111.

[12]*The Wealth of Nations* Book V, i.f. pp.781-82. For a debate over the interpretation of this controversial passage see E.G. West, "Adam Smith's Two Views on the Division of Labour," *Economica* n.s., vol. 31, (Feb, 1964): 23-32; and Nathan Rosenberg, "Adam Smith on the Division of Labour: Two Views or One?" *Economica*

The possible role of experience even without formal training has certainly been considered by economists and economic historians. Indeed, Gary Becker begins his book, *Human Capital* by turning first to on the job training before turning to the role of schooling. And learning by doing and Horndal effects have been examined by economic historians.[13]

But the mere existence of environmental effects on human resource development does not necessarily imply their historical significance, if their distribution in the labor force is unchanging over time. Indeed, one standard approach is to view the underlying distribution of abilities, reflecting native intelligence and dexterity, as unchanging from generation to generation. This approach can be dated back at least as far as Ricardo. In his *Principles*, after noting differences in skills among workers, goes on to argue that:

> We may fairly conclude, that whatever inequality there might originally have been in them, whatever the ingenuity, skill, or time necessary for the acquirement of one species of manual dexterity more than another, it continues nearly the same from one generation to another; or at least, that the variation is very inconsiderable from year to year...[14]

Hicks adopts a similar approach in his *Theory of Wages* .[15]

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n.s., vol. 32, (May, 1965): 127-139.

[13]See Paul David, "The 'Horndal Effect' in Lowell, 1834-1856," *Explorations in Economic History* vol. 10 (1973): 131-150; Paul David, "Learning by Doing and Tariff Protection: A Reconsideration of the Case of the Ante-Bellum United States Cotton Textile Industry," *Journal of Economic History* vol.30 (Sept., 1970): 521-601; William Lazonick and Thomas Brush, "The 'Horndal Effect' in Early U.S. Manufacturing," *Explorations in Economic History* vol. 22, No.1, (Jan., 1985): 53-96.

[14]David Ricardo, *On the Principles of Political Economy and Taxation* (1817; reprinted Penguin Books, 1971), p.64.

[15]J.R. Hicks, *The Theory of Wages*, 2nd ed., (London: Macmillan, 1963), p.33.

After noting this argument, Robert Solow and Peter Temin in their survey of the determinants growth go on to indicate why there may be historical changes in skill levels resulting from experience:

> But the relation between skill and experience cannot be treated so simply. As jobs changed, the amount of experience changed. As traditional apprenticeship programs were abandoned, the communication of skills was altered. As education became more widespread, the aptitude for on-the-job instruction undoubtedly rose. As workers became more used to factory discipline, their willingness to learn probably also increased. And as workers became more adapted to urban life, their ability to focus on jobs probably rose too. [16]

A related issue that arises is the difficulty of defining skill. One tactic commonly employed by economists and economic historians to finesse the problem of definition is to measure it by wage differentials between various groups.[17] However, this still presents the difficulty of distinguishing between the "real" quantity of skill versus the premium the market assigns per unit of that skill.

An environmental approach would begin by considering the characteristics of the human agent that would allow skill to develop. For the purpose of definition, one can begin prosaically by turning to Webster's. Among other definitions of "skill," Webster's 2nd International Dictionary offers the following:

> #3 The ability to use one's knowledge effectively and readily in execution or performance.
> #4 a power or habit of doing a particular thing competently; a developed or acquired aptitude or ability; an accomplishment.
> #7"psychology : a."smoothness and good co-ordination in the execution of a learned motor performance.

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[16]Robert Solow and Peter Temin, "Introduction: The Inputs for Growth" *The Cambridge Economic History of Europe*, vol. VII, Pt. 1, p.14

[17]See for example, Chinhui Juhn, Kevin Murphy, and Brooks Pierce: Wage Inequality and the Rise in Returns to Skill," *Journal of Political Economy* vol. 101, No. 3 (June, 1993): 410-442; and Jeffrey G. Williamson, *Did British Capitalism Breed Inequality?* (Boston: Allen & Unwin, 1985), Appendix C, pp.232-237.

b. A motor performance that has become facile and well integrated as the result of practice.

The environmental perspective provides some indication of how these qualities might be acquired.

The environmental view of skill development just discussed presents several basic issues for the economic historian. First has there been a genuine process of skill development of this sort pertaining to basic workplace activity? Second what social and environmental factors facilitate the development of skill? Third, what causes variation in the extent to which skill is created in various situations?

This paper will attempt to apply the environmental approach to human resource development to the case of farm labor in Victorian England. There are several reasons for focusing on farm labor. First it has been a common task. Thus, it can be reasonably taken as an important sector and aspect of common labor. Second, it is likely that a distinctive life long environmental role played a factor here as is evident in common contrasts between rural and urban environments (refer to Adam Smith). Third, because agriculture was so extensive and hence has been extensively studied by historians, there is likely to be a range of evidence available for examining the role of environmental influences in skill development. Fourth, since it has been less studied than worker characteristics in the manufacturing sector, there is more possibility of getting a clear view untarnished by previous assertions of definite trends in one direction or another in worker skills as in the controversy over the possibility of deskilling. This paper will focus on farm labor in Victorian England. Farm labor was heterogeneous even in Victorian England. But in Victorian England there was extensive use of hired farm labor hence making possible a focus on the technical as opposed to allocative aspects of agriculture.

Consideration will be given to the following issues: 1) Was there an experiential/environmental learning process in skill development for farm workers --

that is was there much of a learning curve, how long did the process take, and was it based to a large extent on experience and trial and error as opposed to direct guidance and instruction from others? 2) What factors influenced the extent and nature of skill development among Victorian farm workers? and 3) Was the process of skill development subject to long term change?

SKILL DEVELOPMENT FOR THE AGRICULTURAL LABORER IN VICTORIAN ENGLAND

The Role of Brain versus Brawn in Victorian Farm-work

The nature of the tasks that arose in Victorian farm labor were diverse ranging from those primarily involving physical exertion --lifting, carrying, drawing, and thrusting[18] to tasks involving considerable dexterity, co-ordination and judgement such as ploughing a straight furrow of appropriate depth, grafting fruit trees, or animal husbandry. If managerial positions are also considered, farm bailiffs had considerable responsibility for keeping accounts and business decisions. The relative importance of physical exertion versus mental effort and nervous control expected of a given worker probably varied considerably and presumably would have depended on the relative cost of non-human sources of energy. Indeed, the amorphous term "agricultural labourer," a single term used by the 1851 English occupational census to classify fully 16 percent of the total male labor force in England in that year, surely disguises the considerable diversity of skill and ability among the almost seven hundred thousand English workers so classified.[19]

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[18]As one commentator put it, " Man himself, considered as an engine, derives his power from alteration in the position of the centre of gravity, and he applies it chiefly by his hands, arms, and legs acting as levers of the third kind." See John Claudius Loudon, *An Encyclopaedia of Agriculture* (London, 1844), p.506.

[19] The number of agricultural labourers relative to the English labour force cited in the text is based on the number of agricultural labourers over age 20 and the size

A number of accounts indicate that on balance a considerable degree of intelligence and judgement were expected of farm workers. Indeed, acknowledgement of substantial skill on the part of agricultural labourers has a pedigree going back at least as far as Adam Smith.[20] In the late Victorian period, the General Report from the Assistant Commissioners reporting on the Agricultural Labourer for the Royal Commission on Labour in the 1890's The Royal Commission on Labour in the 1890's affirmed the importance of intelligence and skill to the farm worker:

> The general impression respecting the ordinary agricultural labourer is that of a man engaged in work which requires little intelligence, skill, or training, but in reality there are few duties which he has to perform which do not call for a certain amount of judgment, dexterity, and practice; and the training and management of horses, the art of ploughing, mowing, or sowing, the use of spade or fork must be learned, and the labourer who had not learned to economise his forces

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of the overall English male labor force aged 20 to 69 in 1851 as reported in E.A. Wrigley, "Men on the Land and Men in the Countryside: Employment in Agriculture in Early-Nineteenth-Century England," in Lloyd Bonfield et al. eds., *The World We Have Gained: Histories of Population and Social Structure* (New York: Basil Blackwell), pp.305, 332. For more detailed discussion of the heterogeneity of skills among those classified as agricultural labourers, see W.A. Armstrong, "The Workfolk" and Alun Howkins, "In the Sweat of thy Face: The Labourer and Work," Chaps. 35 and 36 respectively in G. Mingay ed., *The Victorian Countryside* vol. 2 (London: Routledge & Kegan Paul, 1981); and E.J.T. Collins, "The Rationality of 'Surplus' Agricultural Labour: Mechanization in English Agriculture in the Nineteenth Century," *Agricultural History Review* vol. 35 (1987): 42-44. For detailed descriptions of the range of tasks expected of agricultural labourers see Loudon, *An Encyclopaedia of Agriculture*, Book V, pp.506-550; and Walter J. Malden, *Workman's Technical Instructor* Morton's Handbooks of the Farm, No. X (London: Vinton & Co., 1896).

[20] See Adam Smith, *The Wealth of Nations* ed. by Edwin Cannan, with a new Preface by George J. Stigler (Chicago: University of Chicago Press, 1976), Bk. I, Ch. X., Pt. II, p.142. For a discussion of Smith's view of the agricultural labourer see William L. Miller, "Adam Smith on Wage Differentials Against Agricultural Laborers," *Atlantic Economic Journal* vol. 9 (1981): 19 - 24.

> and attack his work at the point of least resistance would be worn out very quickly.[21]

Orwin and Whetham provide another eloquent statement that skills were indeed involved in farm work in the mid-nineteenth century:

> These lowly-paid men were craftsmen and skilled workers. Practically every process in farming at that time was done by manual or horse labour, and skill in the use of tools was essential to every farm worker. The laying out of a field for ploughing, the accurate setting of the plough, the ploughing of a straight furrow at the right depth, the cunning use of a scythe, the laying of a hedge, the swinging of a flail, were all jobs calling for intelligence, exactness and training, while the proper care of animals called for patience, observation and understanding only achieved after considerable experience.[22]

Yet another assessment of the farm labourer of the 1870's stated:

> It was an error to assume that the agricultural labourer of that day was an uneducated oaf. It is true that he had no book-learning, but he had a shrewd common sense, while his knowledge and powers of observation with regard to crops, weather, seasons, and all other things that came within the narrow range of his hard and dismal life, were marked and hereditary.[23]

An insightful statement of the nature of both the observational powers and manual dexterity required of the Victorian agricultural labourer and on the limits on his knowledge, was made by Henry Vaughan in his report to Parliament as an Assistant Commissioner on the Employment of Women and Children in Agriculture in 1843:

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[21] Assistant Commissioner's Reports on the Agricultural Labourer. The Royal Commission on Labour. Vol. V. - Pt. I General Report. Parliamentary Papers 1893-94. Vol. 37, pt. II.-1
[C.6894-XXV.], p.38.

[22]Christabel S. Orwin and Edith H. Whetham, *History of British Agriculture 1846-1914* (London: Longmans, Green and Co., 1964), p.82.

[23]Jesse Collings, *Land Reform: Occupying Ownership, Peasant Proprietary, and Rural Education* (London: Longmans, Green, and Co., 1908), p.24.

> The Agricultural labourer spends his life amongst the works of nature, possesses much manual skill, a quick sight, a faithful and exact memory (as all must know who have been in the habit of hearing him examined), an observation by no means naturally inert, yet his knowledge has hardly any form or shape; and of the laws of the natural, and vegetable, and mineral world, which he daily sees and handles, he is ignorant. Superstition (the result here, at least, of ignorance) still lurks among the labouring classes in these counties....[24]

Ploughing, in particular was singled out by a number of writers on agricultural practice as a task involving skill. For example, the retrospective assessment of George Ewart Evans,

> One of the skills that had the highest acclaim in the East Anglian countryside under the old farm economy was the ability to draw or plough a straight furrow and lay a level stretch (a section of ploughed land) so that it looked like a well-made length of corduroy.[25]

Henry Stephens in his influential manual on Victorian farm practice, written in the mid-nineteenth century, provides a description of the problems that can arise from bad ploughing:

> many particulars have to be attended to in ploughing land into a ridge of the most perfect form. Plowmen differ much in bestowing attention on these particulars; some can never make a good crown, others a good furrow-brow and open furrow, while others will make them all in a passable, but still objectionable manner. This last class of ploughmen, however, is preferable to the other, because the injurious effects of the bad ploughing of the former are obvious; whereas the effects of mediocre compared with first-rate ploughing are not easy to ascertain, though no doubt the difference of their effects must be considerable in many respects. "It is well known," observes Sir John Sinclair, "that the horses of a good ploughman suffer less from the work than those intrusted to an awkward and unskilful hand, and that a material

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[24]"Report on the Counties of Kent, Surrey, and Sussex, by Henry Halford Vaughan, Esq." in "Reports of Special Assistant Poor Law Commissioners on the Employment of Women and Children in Agriculture," *Parliamentary Papers* 1843 vol. 12 [Cmd. 510], pp. 158-59.

[25]George Ewart Evans, *Tools of Their Trades: An Oral History of Men at Work c. 1900* (New York: Taplinger Publishing Co., 1971), p.64.

> difference will be found in the crops of those ridges tilled by a bad ploughman, when compared to any part of the field where the operation has been judiciously performed.[26]

Stephens also discusses the consequences of bad ploughing:

> every sort of crop grows unequally on an ill-ploughed ridge, because the soil is more kindly on the better ploughed parts; but the evils of bad ploughing are not confined to the season in which it is performed, as it renders land unequal when broken up again, and the thinner and harder portions cannot yield so abundantly as the deeper and more kindly...[27]

Stephens even cites an estimate for Scotland to the effect that poor ploughing could lower yields by as much as one quarter.[28]

John French Burke, another contemporary commentator on Victorian farm practice, emphasized the dexterity required of the ploughman and the skill involved in managing the horse while ploughing:

> There is in fact, a certain degree of taste in ploughing, as well as in everything else, -- a kind of tact, which is difficult to be taught, and hardly to be acquired except by a sort of instinct. Many a capital rough-rider is still but an indifferent horseman, because he has a heavy hand on his horse's mouth; and many a good seaman is still but an indifferent steersman, because he feels the helm imperfectly. You see the one

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[26]Henry Stephens, *The Book of the Farm: Detailing the Labors of the Farmer, Steward, Ploughman, Hedger, Cattle-man, Shepherd, Field-Worker, and Dairymaid*, vol. I, (New York: C.M. Saxton and Co., 1857), p.398. For a discussion of Stephens' career as an agricultural journalist see the introduction by E.J.T. Collins to Henry Stephens, *Victorian Farming: A Sourcebook* edited by C.A. Jewell. (Barry Shurlock).

[27]ibid., p. 399.

[28] ibid., p.398 "Marshall contends that want of good tillage incurs a loss of as much as 1/4 of the crops throughout the kingdom, which may be an approximation to the truth in his day; but ploughing is certainly now better performed in Scotland than it was, though it must be owned that by far the greatest part of the process is yet of a mediocre description, and the reasons for the mediocrity of the work are not hard to find."

> pulling at a horse's head, straining him out of his paces, fretting and teasing him; yet with another, who knows how to play with his mouth, he will ride light in hand and pleasantly. So the seaman who can humour the helm makes good and easy steerage; while another toils and sweats, throws the vessel up in the wind, and makes her roll. So likewise the ploughman who tills the ground with dexterity, never presses upon the plough without necessity -- a mere touch, or a glance of the eye, tells him when she is going wrong, and a slight turn of the hand sets her instantly right; whereas a clumsy fellow, without feeling in his palms or readiness of perception, is continually either throwing the plough out, or she is riding upon the heel or point, straining the team, tiring himself, and altogether making bad work.[29]

Ploughing was regarded as a task of sufficient skill in Victorian England that ploughing matches were frequently held, with competitors striving to produce the best surface finish.[30] And it seems to have been common for farmworkers to spend

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[29]John French Burke, *British Husbandry; Exhibiting the Farming Practice in Various Parts of the United Kingdom* (published under the superintendence of the Society for the Diffusion of Useful Knowledge) (London: Baldwin and Cracock, 1834), vol. I, p.41.

Henry Stephens also employed a nautical analogy to explain the skill involved in ploughing:

> When all the particulars which plowmen have to attend to in executing their work-- in having their plow-irons in a proper state of repair, in tempering them according to the kind of ploughing to be executed, in guiding their horses, and in ploughing the land in a methodical way -- when all these particulars are considered, it ceases to surprise that so few plowmen should be first-rate workmen....The ship has been aptly compared to the plow, and the phrase, "ploughing the deep," is as familiar to us islanders as ploughing the land: to be able to put the ship in "proper trim," is the perfection aimed at by every seaman; so, in like manner, to "temper a plow" is the great aim of the good ploughman; and to be able to do it with judgment, to guide horses with discretion, and to execute ploughing correctly, imply a discrimination akin to sailing a ship.

Stephens, *Book of the Farm*, p.252.

[30]Stephens, *Book of the Farm*, vol. I, p.278.

Sunday mornings strolling through fields in their area, inspecting and appraising the plow work that had recently been done.[31]

Shepherding, ditching, hedging, drilling, and thatching were other farm tasks commonly regarded as highly skilled tasks and that in many cases were primarily undertaken by expert specialists.[32]

Tasks commonly assigned to women also appear to have involved the accumulation of skill, as the following account by Orwin and Whetham indicates:

> Butter- and cheese-making were not only heavy physical work, but highly skilled, calling for long experience and accurate judgement, in the days before mechanical devices came in to lighten toil, and scientific ones to give accuracy to the old empirical methods. The skill, particularly in cheese-making, was an intimate and personal one, which some might never acquire, hence the extraordinary variety in the quality of farmhouse cheese and butter sold. Happy was the farmer whose wife had inherited the skill and who could pass it on to her daughters.[33]

Women were also regarded as having developed superior skills for certain kinds of harvesting, in part attributable to the greater care they took with their work:

> Their [women's] expertise in turnip-picking was a tribute to their manual dexterity: 'for a woman, though not so strong is more alert, and

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[31]See Fred Kitchen, *Brother to the Ox: The Autobiography of a Farm Labourer* (London: J.M. Dent, 1940), p.49; Evans, *Tools of Their Trades*, p.64. Howkins, "In the Sweat of thy Face," p.514.
According to Howkins account of these Sunday strolls, based on an oral interview with a former farm worker, "A phrase like 'it looks as though a lot of bloody old chicken have been in there' could easily lead to a fight in a strange pub." ibid., p.514.

[32]See J.M. Wilson, *The Rural Encyclopedia* (Edinburgh: A. Fullarton, 1847), vol. 4, pp.207-8; Malden, *Workman's Technical Instructor*, p.146; Howkins, "In the Sweat of the Face," p.514.

[33]Orwin and Whetham, *History of British Agriculture*, p.86.

> generally, more neat in picking the young turnips with her fingers, when they are so close that the hoe cannot separate them.'[34]

An important indication of the extent to which agricultural labour involved the development of skill is the extent to which this was reflected in the market for such labour. This topic warrants much fuller consideration than it is possible to provide here. However, some preliminary observations are possible. To begin with the claim that agricultural labour involved the development of skill has to confront the seemingly low compensation received by agricultural labourers. A. D. Hall, writing in the early twentieth century, explicitly stated, "considering the comparatively skilled character of his [the farm labourer] work, he is much worse paid than his fellows in any other industry."[35] Comparisons of compensation for agricultural labour with other occupations is complicated by among other factors the frequent practice of various forms of payment in kind to farm workers. As a rough guide, one can turn to the recent assessment by Armstrong, that between 1879 and 1914, "average agricultural remuneration is unlikely to have reached more than 60 percent of that obtaining in [14 industrial occupations]."[36]

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[34]T.M. Devine, "Women Workers, 1850-1914," in T.M. Devine ed., *Farm Servants and Labour in Lowland Scotland 1770-1914* (Edinburgh: John Donald Publishers,), p.102.

[35] Alfred D. Hall, *A Pilgrimage of British Farming* (1913), p.443. According to Evans' assessment, "All farm-workers were *labourers* with that term's implication of unskilled and unintelligent toil, and that label stuck to them until recent years. And it must be admitted that the low level of wages the farm-worker received appeared to the uninformed justification enough for not changing their image of him. But the farm-worker was practised in numerous skills as well as ploughing and drilling, and no apology is offered here for including him among the craftsmen as a craftsman of the highest order." *Tools of Their Trade*, p.64.

[36]Alan Armstrong, *Farmworkers in England and Wales: A Social and Economic History, 1770-1980* (Ames, Iowa: Iowa State University Press, 1988), pp.138-39. For further discussion of some of the issues involved in comparing wages in agriculture with other occupations see E.H. Hunt, *Regional Wage Variations in Britain 1850-1914*

However, the relatively low compensation of agricultural labourers can be accounted for in part by amenities and the low cost of rural life not incorporated in payment in kind adjustments. Another important consideration is that since agriculture was a declining sector, the demand for agricultural labour was probably declining relative to its supply and hence it would not be surprising if any skill premium for specifically agricultural skills was low.

More difficulty would seem to be posed by some accounts that wages were paid according to some customary level irrespective of the ability or productivity of the worker. For example, Hall commenting on the situation at the end of the nineteenth century stated, "Men are paid far too much by the customary scale, whether they are good or bad workers, and the farmer does not sufficiently consider how he can make them earn more both for themselves and for him."[37]

However, there is ample counter evidence that premiums were commonly paid both for more skilled specialists and for more skilled work even for the common agricultural labourer.[38]

(London: Oxford University Press, 1973); A. Wilson Fox, "Agricultural Wages in England and Wales during the Last Half Century," *Journal of the Royal Statistical Society* LXVI (1903): 273-348; Jeffrey G. Williamson, "Did English Factor Markets Fail During the Industrial Revolution?" *Oxford Economic Papers* vol. 39 (1987): 641-78.

[37]A.D. Hall, *Pilgrimage of British Farming*, cited in *The Agrarian History of England*, vol. VIII, p.59.

[38] See Amstrong, *Farmworkers*, p.118; Alan Everitt, "Farm Labourers, 1500-1640," in Christopher Clay ed. *Rural Society: Landowners, Peasants and Labourers 1500-1750* (Cambridge: Cambridge University Press, 1990), p.201;Reginald Lennard, *Economic Notes on English Agricultural Wages* (London: Macmillan, 1914),p.77, n.2. Robin notes the presence of differentials for skill and responsibility but states that the amount of such differentials that took a monetary form was small. See Jean Robin, *Elmdon* (Cambridge: Cambridge University Press, 1980), p.17

For example in his report to the 1843 Commission on Women and Children in Agriculture, Henry Vaughan cites the case of agricultural labourer A who earned 43.5 pounds a year and agricultural labourer B who earned 49.7 pounds per year. Their employer explained the difference by stating, "A is a fair specimen of an agricultural laborer, and was some days ill. B. was the best workman in my employ, physically strong, and could turn his hands to all kinds of work as the seasons drew round."[39]

The agricultural labour market in fact seems to have been a relatively complex one. Many farmworkers switched employers almost every year, changing at the annual hiring fairs. Other workers would stick with the same employer year after year, a result some accounts suggest of a good match between a farmer informed by experience of the skill and reliability of his worker and a worker satisfied with his situation.[40]

In fact, more skilled types of farm work could receive extra compensation in a variety of ways ranging from being able to specialize in more skilled tasks receiving extra compensation to provision of piecework payment to receiving preferential hiring or greater job security. And it does appear that at hiring fairs, farmers would ask after a potential worker's skills.[41]

Henry Vaughan observed in his report to the 1843 Commission on Women and Children in Agriculture that workers with more versatile training were more likely to

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[39]Parliamentary Papers, 1843 Vol. 12 [Cd. 510], p.156.

[40]See for example, Armstrong, *Farmworkers*, p.144; Michael Robson, "The Border Farm Worker," in T.M. Devine ed., *Farm Servants and Labour in Lowland Scotland, 1770-1914* (Edinburgh: John Donald Publishers,), p. 79.

[41]See for example, Kitchen, *Brother to the Ox*, p.100.

find employment throughout all seasons of the year and in the face of competition from other workers:

> For a man to turn his hand to all the works of the varying seasons, he must be versatile and accomplished; and without this capability his occupation is not secure and steady...As population increases, the labour of the field, in a purely agricultural district, becomes more and more the subject of competition, and consequently an exercise of adroitness, as well as of honesty and steady habits.[42]

On the other hand some observers argued that more skilled workers were more likely to be assigned cottages and that this could reduce their mobility. Because of the offer of cottages, skilled workers were less likely to leave in search of the other employment implying a less integrated labour market with less bidding for their skill.[43] Presumably the gain from considering other offers did not outweigh the transactions costs of moving suggesting an expected relatively modest skill premium on the part of the more skilled worker.

In sum, accounts of the agricultural labour market can be reconciled with the view that agricultural labour did involve the development of skill, though this is admittedly a topic in need of further research, especially to establish the quantitative dimensions of what was involved.[44]

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[42]Parliamentary Papers 1843, vol. 12 [Cd. 510], pp.155-56.

[43]See for example, Lennard, *English Agricultural Wages*, p.32.

[44]For another exposition of the agricultural labourer as possessing skills see Stuart MacDonald, "Agricultural Improvement and the Neglected Labourer," *The Agricultural History Review* vol. 31, Part II (1983): 81-83-85.

Did Becoming a Farm Labourer Involve a Process of Learning and How did Such Learning Occur?

A number of contemporary accounts indicate that for many farmworkers and farm tasks, there was a process of learning and skill development.[45] For example Henry Vaughan, in his report to the 1843 Commission on Women and Children in Agriculture came across the view that skill development for the agricultural labourer could continue well into adulthood:

> I was told by a very intelligent occupier of land, that the general skill of an able-bodied man decidedly increases so long as his strength lasts.[46]

This view was seconded by Flora Thompson in her account of Oxfordshire village life. She cited workmen from her village who were of the view that "there were ins and outs in good land work which took a man's lifetime to learn." [47] And Burke said of workers in a Cumberland district, "these men are bred from infancy to all kinds of agricultural labour, and are generally expert in the use of the spade, scythe, etc."[48]

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[45]For a more recent claim for the U.S. that farm work involved training and skill development see Braverman, *Labor and Monopoly Capital*, p.434, "The farm hired hand was able to be of assistance to the farmer because he was the product of years of farm life and had a mastery of a great many skills involving a knowledge of land, fertilizer, animals, tools, farm machinery, construction skills, etc., and the traditional abilities and dexterities in the handling of farm tasks. Only in this way could he be set to work by the farmer in ploughing, milking, caring for animals, mending fence, harvesting etc. To be sure, there was unquestionably a distribution of skills, and many farmworkers, such as those employed in cotton or fruit picking and other such "plantation" tasks, did not possess the all-around skills of the working farmer. But to disregard, as is now customary, the broad range of abilities required of so many farmworkers and to be deceived by the use of the catch-all designation of "laborer" is to deal not in social science but in promotional labelling."

[46]Parliamentary Papers 1843, vol. 12 [Cd. 501], p.155.

[47]Flora Thompson, *Lark Rise to Candleford: A Trilogy* (London: Penguin books, 1973), p.49.

[48]John French Burke, *British Husbandry*, vol.3, p.61.

In general, contemporary accounts of the process of skill development for agricultural work pointed to the role of experience, in particular trial and error, rather than a process of direct instruction and supervision. Henry Vaughan provided an especially insightful general formulation of the process of skill development for agricultural labour in his report to the 1843 Commission on Women and Children in Agriculture:

> labour is the agriculturalist's special education, as school is his general education. That such discipline is needful from an early period, seems undeniable, when we consider the accomplishments which he must possess in after-life, as well as the manner in which, at present, he is obliged to acquire them... The use of the different implements of husbandry in the most effective manner depends unquestionably upon general rules as much as the use of the sword and the musket. There is in the nature of things a flail exercise, and a scythe and plough exercise, as real though ruder than that of less peaceful weapons; but as the use of these instruments has never been analyzed, the novice is not drilled and instructed in their management; he must learn entirely by experience, -- by his own mistakes and success. The knowledge which he obtains, too, is of the same nature, -- not imparted generally and together, but snatched up piecemeal and imperceptibly, resulting entirely from familiar intercourse with the subject, and inured so directly into his practical habits as to take often no intellectual form at all.[49]

Fred Kitchen, in his account of learning to become a farm labourer in turn of the century West Riding of Yorkshire emphasized the role of trial and error, with occasional supplementation by imitating the example of more experienced workers and to some degree their prodding and correction:

> the lad had been taught the selfsame, and were only carrying on the old tradition -- that the only way to learn is to find out. A lad was never shown how to do a thing; to show him how was to spoil him. The only way to learn either ploughing, thatching, stacking, or any other skilled work, was to watch how other people did it, and then learn your skill by trial and error. Happily that method is not in force to-day, though it had much to recommend it, for a lad took more notice of how a thing was

[49]Parliamentary Papers 1843, vol.12 [Cd. 510], p.155.

> done by watching someone else than he would by someone showing him just how, while the boot no doubt impressed it on his memory.[50]

The role of trial and error was particularly emphasized in the case of learning to plow. Thus Stephens, the Victorian agricultural commentator, observed:

> and after young men possess sufficient strength to hold the plow, they are left to acquire a knowledge of ploughing more through sheer experience than by any tuition given them by those who are better acquainted with the art; and as excellence acquired in it cannot be bequeathed to the rising generation, its knowledge must be acquired ab initio by every generation...[51]

Kitchen also emphasized the role of trial and error rather than direct instruction in the case of learning to shear a sheep:

> It was then I clipped my first sheep - just to get my hand in - and it was done in my spare time at night as a matter of course. The ewe I practised my skill on was a very ancient Wensleydale, with not much go on it, and fairly straight in the wool. Before I had finished, the old ewe was all go and the wool anything but straight. I struggled and sweated with that sheep for a good hour - it took George about ten minutes to clip a sheep - and when I had finished I really felt sorry for the old ewe. No wonder she kicked; I had nicked the skin in several places and she looked a sorry object when at last I let her go. It would have been much nicer both for the ewe and myself, if George had shown me how by helping, but that was never done, it spoiled a lad to be helped, so I just watched how he did it, and then - it was rather rough on the sheep.[52]

In addition to the role of trial and error, a number of accounts indicated the importance of observation in the development of farm skills. Thus Stephens commented:

> Good Plowmanship requires greater powers of observation than most young plowmen possess, and greater judgment than most will take time

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[50]Kitchen, *Brother to the Ox*, p.47.

[51]Stephens, *Book of the Farm*, vol. 1, p.398-99.

[52]Kitchen, *Brother to the Ox*, pp.79-80.

> to exercise, in order to become familiarized with all these particulars, and to use them all to the best advantage.[53]

And Henry Vaughan stated:

> Now the employment in agriculture, i.e., the special education of the agriculturalist, is of a purely practical and material kind, and furnishes a discipline, the most opposite to the formal education of school. Here he lives in a world entirely material and sensible, acts upon it by material means, and receives from his conversation with it an education of the muscles and senses, and to a certain degree of the understanding and imagination, but in the most unconnected and least intellectual form.[54]

The role of observing others at work was emphasized in the biography of the agricultural labourer, Joseph Ashby:

> Joseph and his companions took of course, to following the men about their business, especially those whose work was a little exceptional - the thatchers, the builders, the men with ferrets. They knew, besides, the ways of every farmer in Tysoe - who was buying machinery, a fresh kind of drill or chaff-cutter or turnip-slicer; who did well with his cattle and who could grow corn. In February of his tenth year Joseph watched draining operations in a low-lying clay field in Church Town....Looking

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[53]Stephens, *Book of the Farm*, vol.1, p.252.

[54]Parliamentary Papers 1843, vol. 12 [Cd. 510], p.157. Vaughan goes on to argue that there were limitations on what education by observation could accomplish:

> If, however, the school education is crippled by the practical employment which encroaches on it, the practical employment itself very much loses its educational character by the want of a preliminary instruction of some kind, which might have explained its lessons, -- or at least so stimulated the faculties as generally to awaken their interest in the subject which it brings before them. As the actual dealing with the physical world has not been preceded by any hints as to its general laws and properties, and is not attended by an intelligent curiosity to ascertain them, the most familiar and daily intercourse fails to convey knowledge concerning it of a coherent kind.

ibid., p.158

> on, a boy would get absorbed in the men's skill, yet not beyond a certain degree, for it was a boy's deepest disgrace to fail, when a crisis came, to see where his weight was needed...[55]

The process of skill development and learning culled out from the various accounts cited above can be summarized by labelling it "the born and raised on the farm hypothesis," which can alternatively be stated as the proposition that experience in rural life from an early age significantly enhanced the farm worker's productivity due to the roles of observation and trial and error attainment of dexterity in various tasks.[56]

Basic Influences on the Structure of the Learning Process for the Agricultural Labourer

A central challenge in considering the role of broad life experiences influencing skill development is the one of trying to establish what systematic factors actually affected the magnitude of these influences. Given the inherent diversity of life experiences, and absent the establishment of such systematic factors, it will be difficult to generalize about the process of skill development. Despite the informality and apparently unstructured, trial and error nature of skill development for farm laboring tasks, one can point to at least 4 factors influencing and structuring skill development among agricultural labourers: 1)biological age of learning 2)the role of repetition 3)the role of standards and guidance 4)the role of diversity and variety.

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[55]M.K. Ashby, *Joseph Ashby of Tysoe 1859-1919* (London: Merlin Press, 1974), pp.15, 39.

[56]One counter piece of evidence to the notion that becoming a farmworker involved primarily cognitive development is the practice noted for the Essex village of Elmdon of determining when a youth should be paid a man's wages by testing his strength. On one farm the test was whether the youth could lift a sack of beans up a set of barnyard steps. See Jean Robin *Elmdon* (Cambridge: Cambridge University Press, 1980), p.87.

1) Biological Age of Learning.

The importance of starting work in agricultural tasks at a young age for their proper mastery was asserted by a number of commentators on Victorian agriculture. According to Alfred Austin in his report to the 1843 Commission on Women and Children in Agriculture:

> It appears to be the common opinion of all persons practically acquainted with the agricultural labouring class, that, unless a boy begin to work in the fields when young, he never thoroughly learns his business. To make a good farm-labourer, an early familiarity with the various kinds of work required on a farm is necessary. The age at which a boy should begin is fixed by some persons at seven, by others at eight or nine, and by others at ten or eleven; but it is generally agreed that after eleven or twelve a boy cannot learn the business of a farm-labourer so well as a boy who begins earlier.[57]

According to another mid-nineteenth century observer:

> The training of a good labourer commences from the time when as a boy he follows his father into the fields, and so far from an agricultural labourer being unskilled, though unschooled, he is a variously skilled workman, and to be good for anything he must be brought up to his profession from early boyhood.[58]

J.C. Morton stated in his manual on farm labour:

> We almost invariably find that the younger the boys go to service (as it is here termed), the better ploughmen and the better labourers they afterwards become.[59]

It is useful to consider why biological age might influence the capacity to master farm tasks. Some commentators suggested that younger minds were more plastic and more

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[57]Parliamentary Papers 1843 vol.12 [Cd. 510], pp.40-41.

[58]From a paper by J.G. Elliott read before the Statistical Society and cited in the General Report of the Assistant Commissioners on the Agricultural Labourer. Royal Commission on Labour. Parliamentary Papers 1893-94 vol. 37 Pt. II.-1 [C. 6894-XXV.], p.38.

[59]J.C. Morton, *Labour on the Farm*, p.78.

responsive to new stimuli and more adept at imitating more experienced workers. For example Henry Vaughan commented in his report to the 1843 Commission on Women and Children in Agriculture:

> The knowledge which he [ag. labourer] obtains ... is... snatched up piecemeal and imperceptibly, resulting entirely from familiar intercourse with the subject, and inured so directly into his practical habits as to take often no intellectual form. His powers of imitation are much needed; and as these last are in their fullest perfection at the early years of life, it is not entirely without reason, even as a matter of training, that he begins his labours as soon as the development of his bodily strength will permit him to do so.[60]

Familiarity with animals was a capacity that some commentators thought was especially important to cultivate at a young age. Thus, Kebbel in his book on the agricultural labourer states:

> It will hardly be disputed that early familiarity with the details of any kind of work is a very great advantage to the man whose lot it is to live by it. In some kinds of work it may be said to be indispensable; and the farmers contend that agriculture is one of these. They say, for instance, that boys can never learn the management of horses unless they begin very young. And we are quite prepared to believe it, since it is observable that a thorough insight into the nature of animals is seldom possessed but by those who have played with them as children. And we must recollect, too, that an intelligent boy is being educated, in a way, all the time he is at work, ... It is by exercising his powers of observation on these and kindred subjects that he rises to the top of his profession...[61]

The practice of introducing children at young ages to animal habits to improve their later agricultural skills has been noted as well by anthropologists studying societies practising traditional agriculture in the twentieth century.[62]

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[60]Parliamentary Papers 1843, vol. 12 [Cd. 510], p.156.

[61]T.E. Kebbel, *The Agricultural Labourer* (1893; New York: Garland Publishing reprint, 1984), p.75.

[62]See Kenneth Ruddle and Ray Chesterfield, *Education for Traditional Food Procurement in the Orinoco Delta* (Berkeley: University of California Press, 1977),

To learn some tasks, it appears that the youth had to have achieved not only the requisite level of cognitive development but also of physical strength in order for experience to be useful. Ploughing was mentioned as one such task. Thus Henry Stephens stated:

> Plowmen cannot learn their profession at a very early age, when every profession ought to be acquired to attain a high degree of perfection in it, and because ploughing requires a considerable amount of physical power, even from the most expert plowmen, and it exacts the greatest exertion of strength by comparison from the youngest in years and the least initiated in the art...[63]

The claim that those who were to engage in farm work would be become more skilled if exposed to a farm environment from a relatively young age raises the more general issue of the relation between biological age and cognitive development. Studies in neurobiology do seem to support both the claim of greater plasticity and ease of learning at younger ages and the claim that environmental stimulus is requisite for proper cognitive development.[64] However these claims are most strongly supported for the period of infancy, well before even Victorian children would have been directly exposed to a farm environment.

Given, among other problems, the difficulty of defining clear measures of learning capability, evidence on how such capability changes with biological age is not likely to be readily forthcoming, even with the active advances occurring in contemporary neurobiology. Nevertheless, the relation between biological age and learning capability does appear to have been one factor influencing when children were put to

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Chap.3.

[63]Stephens, *Book of the Farm*, pp.398-99.

[64]See Carla J. Shatz, "The Developing Brain," *Scientific American* (Sept., 1992):60-67; and Jerome Kagan, "Continuity and Change in the Opening Years of Life," in Robert N. Emde and Robert J. Harmon eds. *Continuities and Discontinuities in Development* (New York: Plenum Press,), pp.28-32.

work on farm tasks in Victorian and England. And it is a factor that economic historians interested in the process of skill development should keep in mind.

2) The Role of Repetition and the Division of Labour

The degree of skill development could conceivably have been influenced by the extent to which repetition of key farm tasks was possible, with its impact on continuing improvement in dexterity. In this regard the seasonality of key farm tasks was sometimes mentioned as a constraint on the amount of repetition and hence on the development of dexterity.

According to Henry Stephens:

> Various causes exist to prevent, or at least retard, an equal degree of perfection being arrived at in agricultural machinery, among which may be noticed one pervading circumstance, that affects, more or less, almost every machine or implement employed. This circumstance is, that all the important operations of the farm are performed by seasons occupying comparatively short periods of time, and, should the artisan be endeavouring to produce any new or important machine, he can only make trial of it in the proper season. The imperfection of human perception is too well known to leave us in surprise at the first attempt of any improvement turning out more or less a failure. The artisan, therefore, will in all probability find that his project requires amendment; and, before that can be effected, the season is past in which a second trial could be made, and, consequently, must lie over for a year, in the course of which may circumstances may occur to cause its being forgotten or laid aside.[65]

For some tasks, including ploughing, it does appear that seasonal limitations could be offset by larger farm size, thus permitting more intensive performance of the task when in season, an application of the division of labor principle.[66]

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[65]Stephens, *Book of the Farm*, p.252.

[66]See for example, Everitt, "Farm Labourers," p.198; Malcolm Gray, "Farm Workers in North-Eastern Scotland," in T.M. Devine ed., *Farm Servants and Labour*

A central issue with regard to the impact of repetition is the extent to which skill and dexterity in performing a given task actually continues to improve with repetition. Marglin has raised this issue, challenging whether for most detail tasks in manufacturing dexterity really does continue to improve after the first few months of experience, hence challenging the first reason cited by Smith in explaining how the division of labor improves productivity. Marglin as well as Braverman have pointed to studies suggesting learning times for various repetitive manufacturing tasks of at most several months rather than a continuing process of improvement stretching over several years, as might be suggested by some interpretations of the division of labor principle.[67]

The role of repetition in improving dexterity has been studied by psychologists and others interested in the development of motor skills. These studies do suggest that the role of repetition and the amount of repetition required to approach mastery is task specific, thus leaving open the possibility that although some tasks, like those pointed to by Marglin and Braverman may involve trivial improvement in dexterity with repetition, others offer the possibility of continuing improvement. The question of how the human nervous system translates increased repetitions into improvements in the form of motor skill performance, that is how the nervous system develops a sense of the form it should be following, remains unresolved. And the question of what pattern of repetition should be pursued to optimize performance appears to be complex as well. Nevertheless, the relationship between task repetition and improvements in

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in Lowland Scotland 1770-1914 (Edinburgh: John Donald Publishers), p.13.

[67]Stephen Marglin, "What Do Bosses Do? The Origins and Functions of Hierarchy in Capitalist Production," *Review of Radical Political Economics* vol.6, no.2 (Summer, 1974), pp.68-69; Braverman, *Labor and Monopoly Capital*, pp.432-33.

dexterity is another central issue in skill development that should receive further attention by economic historians.[68]

3) The Role of Standards and Guidance

If the repetition of tasks was to lead to improvement in the skill and dexterity with which they were performed, then finding standards of good performance to which the worker in training could aim would seem to have been of some importance. Aside from sub-conscious standards that, as suggested by the motor-skill literature cited above, the nervous system may provide as repetition occurs, workers learning their tasks could also have relied on more experienced workers as models of good performance. Some models of performance seem to have been available at second hand, for example the ploughing matches and inspection of ploughed fields noted above. But more direct interaction between experienced and inexperienced workers also seems to have been present. According to one account by a Suffolk ploughman born in 1880:

> I started when I was very young - with a good bloke, too. He put me into the way of a lot of things. He showed me how to work a horse and how to treat a horse and he also showed me how to govern a horse. I was thirteen when I started ... And I went to plough and I got on with it all right. Then I went to Yorkshire.[69]

Fred Kitchen, a West Riding agricultural labourer born at the turn of the twentieth century, made extensive mention of the guidance he received from others more experienced than himself.

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[68]For brief surveys of the findings of the motor skills literature on the relation between repetition and improvements in dexterity see Karl M. Newell, "Motor Skills," in Larry R. Squire editor, *Encyclopedia of Learning and Memory* (New York: Macmillan, 1992), pp.441-43; and Alan Baddeley, "When Practice Makes Perfect," Chap. 7 in *Human Memory: Theory and Practice* (Boston: Allyn and Bacon, 1990).

[69]Evans, *Tools of Their Trades*, p.65.

> I was at a disadvantage compared with most village lads in that while I knew a lot about woodcraft and keepers and mole-catchers I knew very little about what comes next on a farm, though I soon picked it up under George's tuition and came to know the meaning of 'there's nothing like leather.'[70]

> Ploughing and pressing for wheat was a highly important piece of work, and after a skilled ploughman like George the pressed seams became a work of art ...I began to improve a lot under George's tuition, so that he said I was getting 'handy with a pair of 'osses' and ought to think of getting hired come Martlemas. His boot-toe and my seat met less often...[71]

> My summer at Hill-top passed very pleasantly, and I believe I learned quite a lot under George's tutoring. He was a good all-around man, and I owe him thanks for letting me have a go at almost every job that turned up, and, I must add, there isn't another class of work that requires so many different kinds of skill from one man as farming.[72]

Some authors have emphasized the importance of the family and in particular the role of father to son and mother to daughter in the transmission of skills. Everitt, in his account of the training of the agricultural labourer in early modern England highlights the role of the family:

> sons, sisters, daughters, and brothers evidently worked side by side; as their children grew up,they were taken to work each morning by their fathers, and gradually trained up, over the years, to follow in their footsteps as ploughmen or shepherds.[73]

Everitt goes on to cite Richard Jefferies account of labourers in the nineteenth century:

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[70]Kitchen, *Brother to the Ox*, pp.44-45.

[71]Kitchen, *Brother to the Ox*, pp.48-49.

[72]Kitchen, *Brother to the Ox*, p.81. For further examples from Kitchen of learning by the example and guidance of others see pp.4, 41, 43, 45.

[73]Everitt, "Farm Labourers," p.198. Allen, *Enclosure and the Yeoman*, p.289 argues that displacement of the yeoman hindered the development of skills such as ploughing because children could no longer learn the skills directly from their parents.

> work for the cottage must be work to please him;and to please him it must be the regular sort to hich he is accustomed, which he did beside his father as a boy, which his father did, and his father before him; the same old plough or grub axe,the same milking, the same identical mowing, if possible in the same field.[74]

And Henry Stephens stated in his manual on nineteenth century farm practice:

> The truth is, the young man who is desirous of becoming a ploughman in a short time should be taught day by day by an experienced ploughman to temper the irons, and guide his plow according to his strength and talents. Very few young men have or are permitted to have such opportunities of learning, and the consequence is, that, as my observation confirms, the best plowmen are generally those who have been taught directly by their fathers, and work constantly upon their fathers' farms.[75]

Nevertheless, Kitchen's account cited above does provide at least one example of how guidance and models for performing farm tasks could be available even without parental supervision (Kitchen's father died when he was quite young). Evidence to be cited below also indicates that it was at least possible to enter a particular farm occupation even if one's parents had not been in that occupation.

4) The Role of Diversity of Stimuli

Yet another set if influences on the development of skill among farm workers that is mentioned by numerous commentators was the diversity of situations and stimuli faced by the farm labourer. The diversity of natural materials that the labourer had to work with, the consequent diversity of activity and implements used, and the further diversity caused by alternation of the seasons were all mentioned by commentators as placing special demands on the cognitive capabilities of the labourer. Perhaps the most famous statement of the mental versatility of the agricultural labourer resultant

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[74]Cited in Everitt, "Farm Labourers," p.199.

[75]Stephens, *Book of the Farm*, p.399.

from the diversity of materials he worked with is that of Adam Smith in *The Wealth of Nations*:

> many inferior branches of country labour, require much more skill and experience than the greater part of mechanic trades. The man who works upon brass and iron, works with instruments and upon materials of which the temper is always the same, or very nearly the same. But the man who ploughs the ground with a team of horses or oxen, works with instruments of which the health, strength, and temper, are very different upon different occasions. The condition of the materials which he works upon too is as variable as that of the instruments which he works with and both require to be managed with much judgment and discretion.[76]

A number of Victorian commentators made similar claims. Henry Vaughan emphasized the diversity of materials and consequent diversity of implements that the labourer had to work with:

> The materials, too, upon which he is called upon to work, and the process of labour which he must perform upon them, differ in kind and number as much as the tools themselves. With all these there is the best and the worst way of dealing, -- a right and wrong method, -- so that their familiar accomplishment requires much practical address and discrimination.[77]

Orwin and Whetham called attention more generally to the diversity of circumstances the farm labourer had to work with:

> Of course much farm work was monotonous and toilsome, but it was never so mechanical as much work in factories. There was always some variety; no one field is exactly like another, and soil conditions vary within the same field, calling for adjustment on the part of the worker. Neither is one beast exactly like the next; each cow and horse has its own idiosyncrasies and needs different treatment. And the alternations of seasons and weather, the different crops grown and stock kept, all combined to make what could have been a richly varied working life, if

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[76]Smith *Wealth of Nations* Cannan ed. intro. George Stigler (Chicago: University of Chicago Press, 1976), Bk.1 Ch. X. Pt.II., p.142.

[77]Parliamentary Papers 1834 vol. 12 [Cd. 510], p.155.

> only the conditions and status of the labourer had been such as to make him feel this.[78]

Some commentators particularly emphasized the diversity of skills resulting from the diversity of implements in use in agriculture. According to Henry Vaughan:

> The agriculturalist, before he can claim work throughout the year, as an able-bodied labourer, must, especially in these counties where the cultivation is so varied [i.e. Kent, Surrey, and Sussex], honestly profess the use of very many implements, which require a peculiar mode of handling, and in spite of their more vulgar form and purposes, no inconsiderable skill to manage with effect. The spade, scythe, the hoe, the axe, the sickle, the flail, the beck, the gabbing-hook, and the other implements of husbandry, -- all require a cunning and handicraft of their own, not exceedingly intricate nor finished, but differing from each other, none to be obtained without practice, and all, if possible to be possessed by one able-bodied man.[79]

William Marshall, a late eighteenth and early nineteenth century commentator on British agricultural practice, emphasized the regional variation in implements used:

> the plough which is constructed in Norfolk in the most complete manner, and furnished with every necessary appendage, has lain useless upon a soil it suited until a Norfolk ploughman was sent to hold it! Nor are these circumstances peculiar to that plough; and I will beg leave to observe, in general terms, that whoever wishes to introduce an implement which is in use in some distant district, would do well to have it not only constructed, but set to work, in the country where it is in use; and I will venture to add, that success cannot be insured unless a person accustomed to the working of it accompanies it, and sets it to work in the district into which it is intended to be introduced.[80]

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[78]Orwin and Whetham, *History of British Agriculture*, p.82.

[79]Parliamentary Papers 1843 vol. 12 [Cd. 510], p.155.

[80]Cited in J.M. Wilson, *Rural Cyclopedia*, (Edinburgh: A. Fullarton, 1847) vol. 3, p.868.

More recently, MacDonald has pointed to the role of worker skill acquisition as a factor influencing the adoption of new implements and techniques in eighteenth and nineteenth century British agriculture.[81]

Because of this apparent diversity of working conditions, some commentators claimed that the agricultural labourer tended to acquire a distinctive mental agility. Thus Henry Vaughan claimed:

> The agricultural labourer spends his life amongst the works of nature, possesses much manual skill, a quick sight, a faithful and exact memory (as all must know how have been in the habit of hearing him examined), an observation by means naturally inert...[82]

The theme of diversity of abilities was put forward by another mid-nineteenth century commentator:

> It requires more varied qualities of mind and body to be a good labourer than to be a good carpenter, whose tools keep him square by line and by rule, etc. While the other makes parallel lines in a field with an awkward thing called a plough, and still more awkward things called horses.[83]

An important general question posed by this putative versatility of the tasks faced by the agricultural labourer is whether it created any long-lasting changes in cognitive habits. A rather influential claim to this effect was made by Smith in *The Wealth of Nations*:

> The common ploughman, though generally regarded as the pattern of stupidity and ignorance, is seldom defective in this judgment and discretion. He is less accustomed, indeed, to social intercourse than the

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[81]See Stuart MacDonald, "Agricultural Improvement and the Neglected Labourer," *Agricultural History Review* vol. 31, Pt. II (1983): 87-90.

[82]Parliamentary Papers 1843 vol. 12 [Cd. 510], pp.158-59.

[83]J.G. Elliott, cited in Summary Report on the Agricultural Labourer, Royal Commission on Labour, Parliamentary Papers 1893-94 vol.37. Pt. II. - 1 [C.6894-XXV], p.38.

> mechanic who lives in a town. His voice and language are more uncouth and more difficult to be understood by those who are not used to them. His understanding, however, being accustomed to consider a greater variety of objects, is generally much superior to that of the other, whose whole attention from morning till night is commonly occupied in performing one or two very simple operations.[84]

Although evidence to support Smith's assertion of lasting cognitive effects of the diversity of the agricultural environment would seem hard to come by, it is of sufficient importance that is should not simply be treated as an antiquarian relic of the history of economic thought. In the last decade or so, neurobiological studies have been done, although admittedly a number of them pertain to animal not human subjects, which have found that the richness and diversity of one's environment does enhance cognitive capabilities, as evidenced in neuron development, even for adult subjects.[85] Given the inherent complexity of defining measures of cognitive development, this is not an issue likely to yield ready fruit for the cliometrician. However, given the potential importance of the issue, it may be topic worthy of some further consideration, for example, in comparative occupational studies.

Patterns of Occupational Recruitment and Mobility for Farm Labour

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[84]Smith, *Wealth of Nations*, Vol. I, Bk. 1, Ch. X, Pt. II, p.142. For a statement of the adverse affects on mental acuity caused by repetitious manufacturing work see ibid., Vol.II, Bk. V,Chap. 1. Pt. III, Art. II., p.302. For discussion of the interpretation of this passage see West, "Adam Smith's Two Views" and Rosenberg, "Adam Smith on the Division of Labour."

[85]See William T. Greenough and Harris D. Schwark, "Age-related Aspects of Experience Effects upon Brain Structure," in Robert N.Emde and Robert J. Harmon, *Continuities and Discontinuities in Development* (New York: Plenum Press), pp.69-91; William T. Greenough, James E. Black and Christopher S. Wallace, "Experience and Brain Development," in Mark H. Johnson ed. *Brain Development and Cognition: A Reader* (Cambridge, U.S.A.: Blackwell, 1993), pp.290-322; Mark R. Rosenzweig, Edward L. Bennett, and Marian C. Diamond, "Chemical and Anatomical Plasticity of Brain: Replications and Extensions, 1970," in John Gaito ed. *Macromolecules and Behavior* 2nd ed., (New YorK: Appleton-Century-Crofts, 1972), pp.205-277.

Although the sources and discussion thus far suggest that agricultural labourers did indeed experience skill development, in part attributable to their cognitive environment from childhood, the issue remains of the importance of this development and just how critical exposure to farm experiences from an early age really was. Cumulative environmental influences on skill development among farmworkers could have been reflected in patterns of occupational recruitment. If exposure to agricultural experiences from an early age was really that important, then one might expect that agricultural laborers would recruited predominantly from parents with agricultural or at least rural occupations. One can in fact distinguish two channels of influence. The first channel would be the direct role of parental instruction or guidance and could imply direct and narrow occupational inheritance from one's parents. The second weaker influence would pertain to the absorption of rural and farm influences without necessary involving direct parental transmission of occupationally specific skills.

In order to study intergenerational occupational recruitment, a sample of marriage registers will be used here for the years 1839-43 and 1869-73. The over all sample consists of approximately 8,000 registers for the two periods combined from some 30 of the 42 registration counties of England.[86] Of course far fewer registers report occupations clearly associated with agriculture. Although the sample sizes for agricultural labouring occupations are not high, they would not suggest the importance of direct parental transmission of occupational skills. In the overall sample, 48 percent of grooms in the 1839-43 period and 38.8 percent of grooms in the 1869-73 period reported an occupational title identical (that is with exactly the same wording) with their father. Of grooms reporting an occupation that can clearly be identified as an agricultural labouring occupation, only 1 of the 6 in the 1839-43 sample and 21.1 percent of the 20 in the 1869-73 sample reporting agricultural labourer occupations

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[86]For a description of this sample see David Mitch, *The Rise of Popular Literacy in Victorian England* (University of Pennsylvania Press, 1992).

reported exactly the same occupational title as their fathers.[87] Considering grooms reporting what could be regarded as more skilled agricultural occupations, such as shepherds and drovers, of 19 such grooms in the 1839-43 sample, 27.8 percent reported an occupational title identical with their father; of 36 such grooms in the 1869-73 sample, 52.9 percent reported an occupation identical with their father.[88] These rates of exact title inheritance would not seem unusually high relative to the overall labor force. In contrast, of 215 grooms who reported occupations as farmers in the 1839-43 sample, 83.6 percent had fathers who were farmers and of 160 such grooms in the 1869-73 sample, 81.3 percent had fathers who were farmers. Of grooms who reported occupations likely to involve smaller scale agricultural operations, such as gardening and market gardening, what could be termed peasants, of 152 such grooms in the 1839-43 sample, 45.3 percent reported their father had an identical occupational title; of 148 such grooms in the 1869-73 sample, 37.1 percent reported their father had an identical occupational title.[89] In sum apart from farmers, for whom direct connections to land might have been especially important; occupational inheritance rates for those in clearly distinguishable agricultural occupations was not especially high.

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[87]In the 1839-43 sample these occupational titles were farmingman, farmservant, and agricultural labourer. In the 1869-73 sample these occupational titles were farmingman, aglaborer, farmingman, farm labourer, and farmservant.

[88]The specific occupational titles listed were in the 1839-43 sample: gamekeeper,seedsman, shepherd,coltbreaker, drover, horsekeeper, cowman, forester; in the 1869-73 sample: cowkeeper, cowman, gamekeeper, hayser, keeper, nurseryman, rabbitcatcher, shepherd, woodman.

[89]The occupational titles included here were in the 1839-43 sample: gardener, husbandman, yeoman, hind, crofter, fisherman; the 1869-73 sample: fisherman, gardener, hind, husbandman, marketgardener, yeoman. Fishermen were included in the small farmer category in the original occupational classification scheme used to analyze this data; it is admittedly questionable to include them in this category for the purposes here and more refined analysis should exclude them from the category.

However, a key ambiguity in this regard pertains to the occupational title of "labourer." It is quite likely that a substantial proportion of agricultural labourers would simply have reported the title of labourer on the marriage register. The rate of intergenerational self-recruitment among labourers was high: of 905 grooms reporting the occupation of labourer in the 1839-43 sample, 75.4 percent had fathers who were labourers; of 769 grooms who reported the occupation of labourer in the 1869-73 sample, 73.6 percent had fathers who were labourers. One can attempt to control for the effect of rural environment by comparing labourers from counties likely to be predominantly rural (although not necessarily all labourers were strictly involved with rural tasks) with labourers from counties more likely to be engaged in industrial and urban tasks. For this purpose the counties of Wiltshire and Hertford can be classified as rural while London, Middlesex, and Lancashire as urban. Of 99 grooms who were labourers from the two rural counties in the 1839-43 sample, 81 percent had fathers who were labourers; while of 62 grooms from these two counties who were labourers in the 1869-73 sample, 89 percent had fathers who were labourers. In comparison, of 179 grooms from the urban/industrial counties who reported the occupation of labourer in the 1839-43 sample, 72.1 percent had fathers who were labourers, and of 221 such grooms in the 1869-73 sample, 68.3 percent had fathers who were labourers. This would suggest a somewhat higher rate of occupational self-recruitment in the rural counties than urban/industrial ones but not overwhelmingly so. And it should be noted that if the comparison is confined to London, of 62 London labourers in the 1839-43 sample, 84 percent had fathers who were labourers, and of 36 in the 1869-73 sample, 80.6 percent had fathers who were labourers. This evidence would also not suggest strong support for the direct role of parental transmission of skills.

However, if consideration is given to recruitment from fathers in all rural occupations, or at least likely to be rural occupations, then the percentage of rural recruitment does increase significantly for those in agricultural labouring occupations. In the 1839-43 sample, of 6 grooms reporting occupation of agricultural labourer, 5 had fathers likely

to be in rural occupations (if 2 with fathers who were labourers not further described are included); in the 1869-73 sample, of 20 who reported the occupation of agricultural labourer, 19 had fathers in likely rural occupations, (including 8 labourers not further described). Of grooms reporting agriculturally skilled occupations, of 19 in the 1839-43 sample, 78 percent had fathers in likely rural occupations (if the 42 percent who were labourers not further described are included) and of 36 in the 1869-73 sample, 86 percent had fathers in likely rural occupations (if the 28 percent with fathers who were labourers not further described are included). These results suggest a likelihood of recruitment from a rural background although they also indicated that it was not impossible to enter agricultural labouring work from a non-rural background.[90]

So far the focus has been on patterns of recruitment. If one considers mobility patterns, one might expect that a distinctive process of environmental skill accumulation in rural areas would be rural-specific and hence limit patterns of mobility. Using similar reasoning, Steckel has found for the mid-nineteenth century U.S., that farmers tended to migrate within much narrower east-west bands than westward migrants in other occupations, a restricted pattern, Steckel attributes to latitude specific knowledge about farming conditions.[91] It is also of interest to note that this latitude specific tendency, according to Steckel, was considerably attenuated with improvements in the diffusion of knowledge. Along similar lines, Rosenzweig and Wolpin report evidence of experiential advantages specific to particular farms for a data set from India covering 1968-71.[92] Nicholas and Shergold do report findings

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[90]For purposes of classification here, "rural" occupations were defined to mean those in the agricultural labourer, agricultural skilled, farmer, small farm enterprise, and labourer [not otherwise defined] categories.

[91]Richard H. Steckel, "The Economic Foundations of East-West Migration during the 19th Century," *Explorations in Economic History* vol. 20 (1983): 14-36.

[92]Mark R. Rosenzweig and Kenneth I. Wolpin, "Specific Experience, Household Structure, and Intergenerational Transfers: Farm Family Land and Labor

on the geographic mobility of agricultural workers in early nineteenth-century England.[93] Their findings are not as directly suggestive of specific agricultural knowledge as those of Steckel or of Rosenzweig and Wolpin. Nicholas and Shergold report that agricultural workers in early nineteenth century England were more likely to move between counties than the labour force generally, but that their moves tended to be short distance ones, perhaps consistent with retaining some local skills, but not so specific as to cause great attachment to individual employers. Redford indicates that Irish migration to English farms was primarily concentrated on harvest tasks and not to more widespread agricultural tasks, suggesting the importance of local knowledge or at least longer term experience in agriculture for retaining permanent positions:

> In many cases seasonal migration or vagrancy led eventually to permanent settlement in England; but the annual visits of the Irish harvesters have left very little impression on the English agricultural districts. When the harvesters or vagrants decided to stay in England they usually settled in the large towns. The Irish never secured a footing in the more highly skilled branches of agriculture; they were good reapers, but not fit for anything else. Even in Scotland, where their position in agriculture became strongest, there were few Irish ploughmen or dairywomen.[94]

Other pieces of evidence are conflicting on whether Victorian agricultural labourers in fact accumulated much occupation-specific skill. On the one hand, out of a collection of working-class biographies compiled by John Burnett, David Vincent, and David Myall for those born between 1750 and 1900, 80 entries list those who reported

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Arrangements in Developing Countries,"
Quarterly Journal of Economics vol. 100, Supplement, 1985: 961-987.

[93]Stephen Nicholas and Peter R. Shergold, "Internal Migration in England, 1818-1839," *Journal of Historical Geography* vol. 13 no.2 (1987): 155-68.

[94]Arthur Redford, *Labour Migration in England, 1800-1850* (Manchester: Manchester University Press, 1926), p.149. Redford's conclusion along with another similar assessment is cited in E.J.T. Collins, "Migrant Labour in British Agriculture in the Nineteenth Century," *Economic History Review* 2nd ser. Vol.29, no.1 (Feb., 1976): 56.

at least some experience as an agricultural labourer. Of these 80, only 15 indicated that they spent their entire labour force career predominantly as an agricultural labourer.[95] Admittedly, sample of those who actually endeavoured to summarize their lives in written and in many cases actually printed form is subject to selection bias and cannot be assumed to be typical. Nevertheless, even making large allowances for such bias and for the fact that agriculture was a declining sector, an 18.75 percent rate of persistence in the occupation is not suggestive of strong occupational specific accumulation of skills.

On the other hand a study of an Essex farm village in the second half of the nineteenth century found that of 114 farm workers in the village in 1861, 11 had died by 1871, 35 had left by 1871, while of the 68 remaining, 62 or 91 percent retained the same occupation in 1871 as in 1861. Moreover, of a total of 114 farmworkers in the village in 1861, 87 percent were born in the village, and of 43 whose fathers birthplace could be traced, 87 percent had fathers who were also born in the village.[96] These findings would seem more supportive of the notion that those born and raised in a rural environment developed farm specific skills.

Were there Trends in Skill Development of the Agricultural Labourer ?

Given the environmental process described thus far by which skills in agriculture were developed, the question can be raised as to whether it really involved any trends and is therefore worth subjecting to historical analysis. One view might be that farm workers were simply born and raised in a rural setting from generation to generation, and that even though growing up in a rural environment did influence the skills they

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[95]John Burnett, David Vincent, and David Myall, *The Autobiography of the Working Class. An Annotated Critical Bibliography* vol. 1 (New York: New York University Press, 1984).

[96]Jean Robin, *Elmdon: Continuity and Change in north-west Essex village 1861-1964* (Cambridge: Cambridge University Press, 1980), pp.75-79.

developed, the process was so uniform and constant over time, that it is of little interest to economic historians nor varied enough to shed much light on the process of skill development. However, existing accounts of the English agricultural labourer do in fact suggest trends in skill development subject to the influences that have been outlined above.

Some accounts of early modern English agriculture suggest a process of division of labour and consequent emergence of specialized skilled agricultural labour with the process of enclosure and formation of large farms making use of hired agricultural workers. Thus according to Everitt:

> with the progress of commercial farming and regional specialization in husbandry, agricultural tasks themselves became more highly specialized, and in large farms the number of specialist labourers was sometimes remarkable.[97]

Everitt emphasizes the importance of the presence of a farm of sufficient size to support full-time specialist skilled workers. For this purpose he contrasts arable and field areas where this was possible with forest and grazing areas where such specialist skills were less likely to emerge. He suggests that when specialist skills were possible full-time a process of transmission from generation to generation emerged:

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[97]Everitt's entire passage states "The work of labourer on the farm was not only characterized by variety, however, but by an increasing tendency for certain men to specialize in particular tasks. Many of the tasks so far mentioned, and much of the work allotted in particular to women and children, such as stone-gathering, weeding, rush-cutting, treading hay, and picking apples required little skill. On small yeoman-farms, moreover, only one or two labourers were employed and there was little scope or necessity for division of labour. But there were numerous farm-tasks, such as ploughing, shepherding, and dairywork, that were highly technical arts requiring careful training, and were undertaken by certain expert men and women only. Skills of this kind did not, of course, originate in this period..." See Alan Everitt, "Farm Labourers," p.197.

> In many fielden parishes, with their emphasis on arable husbandry, the supply of work was relatively abundant and farms were large enough to employ a sizeable labour force; ...sons, sisters, daughters, and brothers evidently worked side by side; as their children grew up, they were taken to work each morning by their fathers, and gradually trained up, over the years, to follow in their footsteps as ploughmen or shepherds. In parishes like these, labourers could afford to stick to the particular farm-crafts in which they had been trained; certain arts became traditional in certain families, and a kind of rigid pattern or hierarchy of skills came into being. Many tasks on the farm acquired their own peculiar customs and mystique; the farmer was careful to enquire into a new employee's "true knowledge in his art," and few labourers, for their part, would have consented to divagate from their particular calling and take up that of another man.[98]

According to Everitt:

> In forest areas, by contrast, labourers were compelled to be more versatile and more adventurous. The influence of kinship and the tendency for certain crafts to become traditional in certain families may have been little less apparent; but the supply of work was less plentiful, and the labourer was often forced to look for employment elsewhere.[99]

In contrast, Robert Allen has recently argued that the process of enclosure with the displacement of yeoman farmers by farms relying on hired labour resulted in deskilling. Allen argues that a much wider range of skills was required on the part of the yeoman farmers than on hired farm servants. Allen points to the limited range of skills expected of farm servants, and in particular notes the focus on ploughing.[100] One could question here whether Allen has given sufficient recognition to the skill development involved in learning to plow. And the narrower range of skills of the hired labourer compared with the yeoman could have been more than offset (and at

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[98]Everitt, "Farm Labourers," p. 198-99.

[99]Everitt, "Farm Labourers," p.199. On p. 200 Everitt qualifies the forest vs. field contrast and warns against exaggerating it.

[100]Allen, *Enclosure and the Yeoman*, pp.219, 289.

least in Everitt's view were offset) by the possibly superior ability of the labourer over the yeoman in the all important task of tillage.

Allen has also argued that by the late 18th century, the South midlands rural labor market was characterized by labour surplus.[101] This leads to the possibility that this led to a situation by the mid-victorian period of a dualistic labour market with one segment consisting of relatively skilled workers and another segment of more casual workers lacking in skills. The situation of the "typical" agricultural labourer with respect to skill mix and the distribution of skills across agricultural labourers would not seem easy to ascertain.[102]

Turning to the later Victorian era during the period of clear exodus from agriculture, concerns were recurrently raised alleging a deterioration in the quality of farm labour. For example the following statements were made in Reports on the Agricultural Labourer for the Royal Commission on Labour in the 1890's:

> It is very commonly said by employers that agricultural labourers are by no means so skilful as they used to be.[103]

> It must be apparently be conceded that there is a general falling-off in experience, arising from the fact that as the elder men, who are generally as efficient as ever, drop off, there are few equally skilled younger men to take their place.[104]

Alfred D. Hall, in his turn of the century commentary on British agriculture stated:

> There is very general complaint that the knowledge of the old crafts is dying out; draining, ditching, brushing and laying a hedge, thatching etc.

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[101]Allen, *Enclosure and the Yeoman*, chap. 12.

[102]For some hints on skill mix see Howlitt, "In the Sweat of Thy Face," and Armstrong, "The Workfolk."

[103]Parliamentary Papers 1893-94 vol. 37 Pt. II-1 [C.6894-XXV], p.44.

[104]ibid., p.44.

> are nowadays in the hands of quite old men, and no successors are in sight...[105]

Hunt has warned that contemporary commentators may well have made exaggerated claims of declining labor quality reflecting little more than grumbling and nostalgic fondness for an imagined golden age. As Hunt notes, the recurrent nature of such claims makes them especially suspect.[106] Nevertheless, it is of interest to consider the reasons given for the putative deterioration of labour skills.

Some accounts ascribe declining agricultural worker skills to the late age of starting to work and a lack of training and supervision provided by farmers and parents. Thus Reports on the Agricultural Labourer for the Royal Commission on Labour contain the following statements:

> Mr. Chapman goes on to point out that skill can only be acquired by early training, and the age at which boys now begin to work and the inability or unwillingness of the farmer to train them as apprentices increases the effect produced by the division of labour which he had spoken of before....[107]

> Labourers, as a rule, considered that the efficiency of labour had not deteriorated, but admitted that the younger hands did not learn special crafts as their fathers before them did.[108]

One land agent testified before the 1867 Commission on Women and Children in Agriculture that:

> that farm labourers are not so skilful as formerly from the absence of long training in farm service, where they were taught every kind of labour required on a farm.[109]

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[105]Hall, *Pilgrimage of British Farming*. Cited in Agrarian History of England and Wales, vol. VIII, p.63.

[106]See E.H. Hunt, "Labour Productivity in English Agriculture, 1850-1914," *Economic History Review* n.s. Vol. 20. no. 2 (August, 1967), p.281.

[107]Parliamentary Papers 1893-94 vol. 37. Pt. II.-1 [C.6894-XXV], p.43.

[108]ibid., p.44.

[109]Parliamentary Papers 1867-68 vol. 17 [C.4068], p.57.

According to Wilson Fox's assessment at the turn of the century:

> The modern labourers are not trained to farm work from early childhood. In former times they frequently did piecework at 8 or 9 years of age under their fathers' eyes, while many lads were brought up in the farm houses and taught every branch of farm labour under the farmer's supervision.[110]

The decline in skill was sometimes associated with the narrowing of skills, the decline in the "all-around" labourer, and this decline in turns was associated by some with an increased division of labour. Thus it was stated in the Reports on the Agricultural Labourer for the Royal Commission on Labour:

> It is very commonly said by employers that agricultural labourers are by no means so skilful as they used to be. This is due to the fact that the all-round sort of man who can lay a hedge, hatch a rick, make a drain, and shear sheep is becoming a thing of the past. There is no doubt of this fact, but it does not necessarily imply that labourers have lost their efficiency for the work which they are asked to do...The principle of the division of labour upon large farms has been so generally adopted that each man becomes accustomed to a particular kind of work, and has little chance of learning work of another sort. Skilled work in some districts is quite as well now as ever it was, but not so often by the ordinary staff of the farm. On the other hand, the use of machinery has called forth a fresh kind of intelligence, and it is probably true to say that the labourers are more skilful now in the use of machines and less skilful in the use of hand tools than they were...[111]

Two general factors were mentioned as responsible for the deterioration of labour skills. One factor was increased mechanization, as noted in the passage just cited. The same report went on to state:

> It is true that machinery has superseded much of the old skilled work, and also true that many young men show great aptitude in learning the

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[110] A. Wilson Fox, "Agricultural Wages in England and Wales during the Last Half Century," *Journal of the Royal Statistical Society* vol. 66 (1903), reprinted in W.E. Minchinton ed. *Essays in Agrarian History* vol. II (Newton Abbot: David & Charles, 1968), pp.169-70.

[111] Parliamentary Papers 1893-94 vol. 37. Pt. II.-1 [C.6894-XXV], p.43.

> management of it; but such things as thatching, hedge slashing or laying, drain laying, mowing, shearing, are in many parts becoming almost lost arts.[112]

According to Wilson Fox's account of contemporary views:

> And where is the old-fashioned all-round man, the older farmers ask, who could mow, thatch, make ditches and fences? Gone, is the reply, because machinery does some of his work; gone, because the thatching is largely gone, and because barbed wire takes the place of fences.[113]

The other factor is that since agriculture was a declining sector, not only were the more able workers attracted to other occupations and to cities and towns but also that the workers who stayed behind showed less interest than previously in learning agricultural tasks. Thus according to statements made for the Report on the Agricultural Labourer for the Royal Commission on Labour:

> It is probably true that less interest in their work, less anxiety to do it well for the sake of having it perfect, is evidenced by all, both old and young; but there is an absolute inferiority in the case of many of the younger hands, due not only to this lack of interest, but to a vague restlessness which makes them uncertain of adhering to field work in any form, and therefore disinclined to take the trouble of acquiring any of the special arts connected with it.[114]

> The general opinion of the farmers is that the men do not work so efficiently as formerly. Some attribute this to the fact that the best of the young men have left the district, while others say that men have ceased to take any real interest in their work. Mr. Clark's farm bailiff at Swaffham, told me that very few of the younger men can plough, and, that, when their old hands leave them, he could not conceive how they were to be replaced.[115]

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[112]ibid., p.44.

[113]Wilson Fox, "Agricultural Wages," pp.169-70.

[114]Parliamentary Papers 1893-94 vol.37 Pt. II.-1 [C.6894-XXV], p.44.

[115]ibid., p.67, B-II,par.11.

> You can hardly get a young man to plough. They don't try and they don't care to learn.[116]

And according to Wilson Fox:

> It is certainly the case that many of the most enterprising of the labourers are finding employment on the railways, in the police force, and in other occupations.

As already noted, these claims of deteriorating worker skill development warrant a certain degree of scepticism. The problem is how to get some purchase on actually measuring any deterioration. One measure that has been considered is the trend in the age distribution of agricultural workers. The age distribution would provide information on claims that prime age workers had been differentially migrated out of agriculture leaving an increasingly disproportionate number of very old and possibly very young workers. The Census did make comparisons of the age distribution of agricultural labourers between 1871 and 1891 and found little change in the age distribution. However, Armstrong has argued that this understates the problem on the grounds that selective migration out of agriculture was already under way by the 1850s. He proposes "lateral" comparisons of the age distribution in agricultural occupations (Agricultural labourers, farm servants, shepherds) with that of the English labor force generally in 1891. He finds that the agricultural labor force did consist disproportionately of those over 55 and under age 20.[117] (Armstrong, p.502).

	under 20	20-34	25-34	35-44	45-54	over 55
Agr. labor force	28.0	11.9	16.8	12.7	11.9	18.6
Remainder of Eng. male occ. pop.	19.8	13.9	23.6	18.1	12.9	11.7
% of A over B	+41.4	-14.3	-28.8	-29.8	-7.7	+58.9

From Armstrong, "The Workfolk" Table 35.3. p.502

[116]ibid., p.86.

[117]Armstrong, "The Workfolk," pp.501-502.

Finally, in evaluating the view that cumulative life experience in a rural environment influenced worker skills, it is of interest to note that commentators on late nineteenth century American agriculture noted differences in skills and capabilities between workers native to a district and migrants.[118]

An Environmental Perspective on Human Skill Development

An environmental approach to human resource development points to the breadth of ways in which skills can be developed through life experiences. In contrast a human capital approach regards the human agent as a black box to which something is done to enhance capabilities, whether attending school, accumulate work experience or go through on the job training. The focus of a human capital perspective is on inputs of one sort or another and consequent outputs. An environmental approach considers more directly the way in which cognitive characteristics of the human agent would change by considering directly the interaction of such characteristics with the environment. Given the range of situations in which skills were likely to have been acquired historically outside of formal schooling or apprenticeship situations, it may be useful to give greater heed to Adam Smith's claim that "the understandings of the greater part of men are necessarily formed by their ordinary employments."[119]

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[118]See Jean Ann Scarpaci, *Italian Immigrants in Louisiana's Sugar Parishes: Recruitment, Labor Conditions, and Community Relations, 1880-1910* (New York: Arno Press, 1980), pp.123-129; and Appendix C - American Farm Labor. The Industrial Commission: -- Agriculture,p.89.

[119]Smith, *Wealth of Nations*, vol. 2, p.302.

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