

Chapter 1 : Full text of "The Collected Works of William Hazlitt: A reply to Malthus. The spirit of "

The collected works of William Hazlitt Advertisement, etc., from The eloquence of the British senate[v. 4] A reply to Malthus. The spirit of the age, etc[v.

Malthus is known in the history of science almost exclusively for his influence on Charles Darwin, exerted almost accidentally. His life, work, and friends were mainly centered on social conditions and political economy, and his work on population was part of these. He did have early training in mathematics, however, and based his arguments on the careful analysis of observed data. Robert Malthus he appears never to have been called Thomas was the sixth child of seven born to Daniel Malthus and his wife, the former Henrietta Catherine Graham. Daniel Malthus, a scholar and a friend and admirer of Rousseau, provided a stimulating home life and education for the boy, and later sent him to study with Richard Graves at Claverton and at the Dissenting Academy of Warrington under Gilbert Wakefield. He read for the mathematical tripos and graduated in , being ninth wrangler; but he also read widely in French and English history and literature and in Newtonian physics. He had already shown his interest in the practical rather than the abstract. He played games and lived a full social life, apparently unaffected by his cleft palate and harelip. The friends he made at Cambridge influenced the rest of his life; the most important was William Otter , later bishop of Chichester. Malthus and Otter traveled extensively in Europe and maintained the relationship after their marriages. Malthus followed graduation with ordination, but more in the tradition of the younger sons of English gentry entering the Church than as a step consistent with his intellectual development. For some years he held a curacy at Okewood Chapel in Surrey, near the home of his parents at Albury, and was active in his pastoral functions from to He showed a genuine interest in and concern for the local people and an understanding of their problems, a sympathy which makes surprising his later references to the laboring class almost as though they were a community apart. From until his death he held a sinecure as rector of Walesbury in Lincolnshire. Cripps, traveled through northern Germany and Norway. Clarke also published a record of his travels. Jesus College elected Malthus to a fellowship in , and he was resident intermittently until he had to resign upon his marriage to Harriet Eckersall in They had one son, Henry, who followed his father into the ministry, and two daughters: Emily, who married, and Lucy, who died before her father. The first known professorship of history and political economy was established there, and Malthus was invited to fill the post. He took it up in , and it gave him the security of a home and an income that enabled him to spend the rest of his life writing and lecturing. In order to teach political economy, Malthus needed to extend his knowledge. He wrote two pamphlets on the Corn Laws , ; a short, unexceptionable tract on rent ; statements on Haileybury , ; and a major work, Principles of Political Economy This included an analogy of his population theory with the quantity of funds designed for the maintenance of labor and the prudential habits of the laboring classes. In the Royal Society elected Malthus to a fellowship. He was also a member of the French Institute and the Berlin Academy, and a founding member of the Statistical Society In he was called upon to give evidence on emigration before a committee of the House of Commons. Although their life was quiet, Robert and Henrietta Malthus traveled and entertained their many friends, including David Ricardo , Harriet Martineau , Otter, and William Empson , who was also at Haileybury. Malthus managed, in spite of the controversy flowing around him, to keep a reputation as a warm, charming, and lively companion. He was not the first to propound the theory that population tends to increase proportionately faster than the supply of foodand he freely acknowledged that he was notnor was the first edition of his Essay on the Principle of Population, published anonymously in , a fully worked-out thesis. Countering apparently rosy visions, Malthus swung to pessimism about the inevitability of poverty and the irresponsibility of the poor, an attitude which his opponents called inhuman. Subsistence increases only in arithmetical ratio. A slight acquaintance with numbers will shew the immensity of the first power in comparison with the second. By that law of our nature which makes food necessary to the life of man, the effects of those two unequal powers must be kept equal.

This implies a strong and constantly operating check on population from the difficulty of subsistence [p. The postulates are taken as self-evident; the deduced consequences are examined in more detail, including the various checks on population, such as postponed marriage, infant mortality, epidemics, and famine. He presented no numerical data to support either the tendency to geometrical rate of growth of the population or the arithmetical rate of growth of food supply; these suppositions are reasonable but largely intuitive. Malthus seems also to have failed to realize that although the existence of checks is a firm deduction, there is no reason to suppose that they operate constantly. The style of the essay—short paragraphs, pungent sentences, and an elegant but matter-of-fact air—undoubtedly contributed to the impact of the work on a community already deeply concerned with the social problems of the Industrial Revolution. It was also brief—only some 50, words—and the edition seems to have been small, since the work is now rare. Malthus realized that he needed more evidence to support his views and that he had not taken sufficient account of the effects of rising standards of living. He therefore listened to criticisms and used information gathered on his travels in Europe, information which tended to be observational rather than numerical. For example, he correlated the poverty of fishermen in Drontheim with their earlier marriages and larger families—in contrast with the people of the interior parts of the country—without considering other possible variables. In it he made the case that linking poor relief to the cost of grain resulted in driving the price even higher. He also pointed out that whereas previously grain had been exported, there was no longer enough to go round; and therefore, assuming that agricultural production had increased or at least not declined, the population must have increased. The first census in Great Britain tended to confirm this assertion. It provided the theoretical framework to the conclusions of the first Essay, with several additional chapters, including information from China and Japan as well as from countries he had visited. The argument was rewritten in terms more academic if less immediate. If, therefore, he argued, it is not possible to maintain the production of food to satisfy the population, then the population must be kept down to the level of food; failure will result in deprivation and misery. He does not seem to have considered abstinence after marriage and was strongly opposed to both abortion and contraception. Later editions of the Essay were rewritten and included new appendixes of evidence, until the sixth edition required three volumes and contained some , words. It was condensed again to some 20, words, but by now it contained a greater element of social comment. There is not only the observation of tendencies but also reference to the bad structure of society and the unfavorable distribution of wealth. There have been numerous reprints and translations. Malthus has been widely read, but he has also been widely misquoted or quoted out of context. His observations have been interpreted by both his supposed followers and his enemies with overtones which suggest that his work is prescriptive rather than descriptive. Influence on the Theory of Evolution. The result would be the formation of a new species [Life and Letters,I, 83]. Influence on Social Theory. Notwithstanding the anonymity of the first Essay, the authorship soon became known. Godwin wrote to Malthus immediately, and the book loosed a storm of controversy that is still rumbling. It has influenced all demographers since, as well as many students of economic theory and genetic inheritance. Besides Godwin, Ricardo corresponded lengthily and critically but accepted much of his theory, as did Francis Place. Ricardo and Malthus did not meet until but formed a valuable friendship. Hazlitt, Cobbett, and Coleridge attacked him for real or supposed views. The current attitude around the end of the eighteenth century, when need for industrial workers was increasing, was that population growth was desirable in itself and that welfare provisions should encourage large families. Malthus wrote him an open letter, published as a pamphlet, in which he supported the plan for general education he made it clear that the poor should be able to understand both the reason for their condition and the means of alleviating it , but he opposed vigorously the building of tenement cottages on the ground that the rents would increase the number of dependent poor except where there was a high demand for labor. He was an analyst, not a creator of imaginative legislation; and the problems he dealt with are still with us in one form or another. More cheerfully and positively, in his Principles of political Economy Malthus was proposing investment in public works and private luxury as a means of increasing effective demand, and hence as a palliative to economic distress. The nation, he thought,

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must balance the power to produce and the will to consume. After all the accretions on Malthusian principles, it was perhaps natural that Marx and Engels should have seen Malthus as an advocate of repressive treatment of the working class, rather than appreciating his anticipation of their own belief that the demand for labor regulates population. Condorcet, and Other writers London, There was a 3rd ed. There have been numerous other eds. It is worth mentioning the facs. Bonar London, , and a modern repr. New York , Extracts from the and eds. There was also a repr. London, , with considerable an original memoir by Otter that includes extracts from The Crisis; there is also a modern repr. There have clearly been many letters and other MSS available to students of Malthus, but few can be located now. The travel diaries are in Cambridge University Library. There is also an extensive bibliography for " in Glass see below. The standard biography is J. Bonar, Malthus and His Work London, ; 2nd ed. There are also C. London, ; and a short biographical sketch by G. Bettany in his ed. Keynes in his Essays in Biography, new ed. London, , 81" A general and appreciative account is G. One of the most vigorous attacks was W. Hazlitt, The Spirit of the Age London, , " Simpkins Pick a style below, and copy the text for your bibliography.

*Collected Works of William Hazlitt: A Reply to Malthus. the Spirit of the Age, Etc [William Ernest Henley, William Hazlitt, Alfred Rayney Waller] on calendrierdelascience.com *FREE* shipping on qualifying offers. This is a reproduction of a book published before*

Synopsis of the dogma The doctrine of the Catholic Church concerning the Holy Ghost forms an integral part of her teaching on the mystery of the Holy Trinity , of which St. Augustine On the Holy Trinity I. The essential points of the dogma may be resumed in the following propositions: He proceeds, not by way of generation, but by way of spiration, from the Father and the Son together, as from a single principle. Such is the belief the Catholic faith demands. Chief errors All the theories and all the Christian sects that have contradicted or impugned, in any way, the dogma of the Trinity, have, as a logical consequence, threatened likewise the faith in the Holy Ghost. Among these, history mentions the following: In the fourth century and later, the Arians and their numerous heretical offspring: Anomans or Eunomians , Semi-Arians , Acacians , etc. Arianism had been preceded by the Subordination theory of some ante-Nicene writers, who affirmed a difference and a gradation between the Divine Persons other than those that arise from their relations in point of origin. In the sixteenth century, the Socinians explicitly rejected, in the name of reason , along with all the mysteries of Christianity , the doctrine of Three Persons in One God. In addition to these systems and these writers, who came in conflict with the true doctrine about the Holy Ghost only indirectly and as a logical result of previous errors , there were others who attacked the truth directly: Towards the middle of the fourth century, Macedonius , Bishop of Constantinople, and, after him a number of Semi-Arians , while apparently admitting the Divinity of the Word , denied that of the Holy Ghost. They placed Him among the spirits , inferior ministers of God , but higher than the angels. Since the days of Photius , the schismatic Greeks maintain that the Holy Ghost, true God like the Father and the Son, proceeds from the former alone. The first statement is directly opposed to Monarchianism and to Socinianism ; the second to Subordinationism, to the different forms of Arianism , and to Macedonianism in particular. The same arguments drawn from Scripture and Tradition may be used generally to prove either assertion. We will, therefore, bring forward the proofs of the two truths together, but first call particular attention to some passages that demonstrate more explicitly the distinction of personality. Scripture In the New Testament the word spirit and, perhaps, even the expression spirit of God signify at times the soul or man himself, inasmuch as he is under the influence of God and aspires to things above; more frequently, especially in St. Paul , they signify God acting in man ; but they are used, besides, to designate not only a working of God in general, but a Divine Person , Who is neither the Father nor the Son, Who is named together with the Father, or the Son, or with Both, without the context allowing them to be identified. A few instances are given here. We read in John "The spirit of truth , whom the world cannot receive"; and in John Peter addresses his first epistle, 1: "The Spirit of consolation and of truth is also clearly distinguished in John In several places St. Paul speaks of Him as if speaking of God. In other places he uses the words God and Holy Ghost as plainly synonymous. Thus he writes 1 Corinthians 3: Peter asserts the same identity when he thus remonstrates with Ananias Acts 5: "Thou hast not lied to men , but to God. It is in His name, as in the name of the Father and of the Son , that baptism is to be given Matthew It is by His operation that the greatest of Divine mysteries , the Incarnation of the Word , is accomplished Matthew 1: "It is also in His name and by His power that sins are forgiven and souls sanctified: "Whose sins you shall forgive, they are forgiven them" John He is essentially the Spirit of truth John With these Apostles He will abide for ever John Having descended on them at Pentecost, He will guide them in their work Acts 8: He is the source of graces and gifts 1 Corinthians And as he dwells in our bodies sanctifies them 1 Corinthians 3: But he operates especially in the soul , giving it a new life Romans 8: Paul ends his Second Epistle to the Corinthians Tradition While corroborating and explaining the testimony of Scripture , Tradition brings more clearly before us the various stages of the evolution of this doctrine. As early as the first century, St. Clement

of Rome gives us important teaching about the Holy Ghost. His "Epistle to the Corinthians" not only tells us that the Spirit inspired and guided the holy writers 8. The same doctrine is declared, in the second and third centuries, by the lips of the martyrs, and is found in the writings of the Fathers. Epipodius spoke more distinctly still Ruinart, "Acta mart. Considered with regard to the Church, the same Spirit is truth, grace, a pledge of immortality, a principle of union with God; intimately united to the Church, He gives the sacraments their efficacy and virtue III. Hippolytus, though he does not speak at all clearly of the Holy Ghost regarded as a distinct person, supposes him, however, to be God, as well as the Father and the Son Against Noetus 8, Tertullian is one of the writers of this age whose tendency to Subordinationism is most apparent, and that in spite of his being the author of the definitive formula: And yet his teaching on the Holy Ghost is in every way remarkable. He seems to have been the first among the Fathers to affirm His Divinity in a clear and absolutely precise manner. In his work "Adversus Praxean" he dwells at length on the greatness of the Paraclete. The Holy Ghost, he says, is God 13; of the substance of the Father 3 and 4; one and the same God with the Father and the Son 2; proceeding from the Father through the Son 4, 8; teaching all truth 2. Gregory Thaumaturgus, or at least the Ekthesis tes pisteos, which is commonly attributed to him, and which dates from the period, gives us this remarkable passage P. One the Lord, one of one, God of God, invisible of invisible. One the Holy Ghost, having His subsistence from God. Perfect Trinity, which in eternity, glory, and power, is neither divided, nor separated. Unchanging and immutable Trinity. Vincent said Ruinart, op. Athanasius who does so in his "Letters to Serapion" P. He had been informed that certain Christians held that the Third Person of the Blessed Trinity was a creature. To refute them he questions the Scriptures, and they furnish him with arguments as solid as they are numerous. They tell him, in particular, that the Holy Ghost is united to the Son by relations just like those existing between the Son and the Father; that He is sent by the Son; that He is His mouth-piece and glorifies Him; that, unlike creatures, He has not been made out of nothing, but comes forth from God; that He performs a sanctifying work among men, of which no creature is capable; that in possessing Him we possess God; that the Father created everything by Him; that, in fine, He is immutable, has the attributes of immensity, oneness, and has a right to all the appellations that are used to express the dignity of the Son. Most of these conclusions he supports by means of Scriptural texts, a few from amongst which are given above. But the writer lays special stress on what is read in Matthew What did God stand in need of? Did He need to join to Himself a being of different nature? No, the Trinity is not composed of the Creator and the creature. Basil, Didymus of Alexandria, St. Gregory of Nazianzus, St. Ambrose, and St. Gregory of Nyssa took up the same thesis ex professo, supporting it for the most part with the same proofs. All these writings had prepared the way for the Council of Constantinople which, in, condemned the Pneumatomachians and solemnly proclaimed the true doctrine. This teaching forms part of the Creed of Constantinople, as it is called, where the symbol refers to the Holy Ghost, "Who is also our Lord and Who gives life; Who proceeds from the Father, Who is adored and glorified together with the Father and the Son; Who spoke by the prophets". Was this creed, with these particular words, approved by the council of ?

Procession of the Holy Ghost We need not dwell at length on the precise meaning of the Procession in God. It will suffice here to remark that by this word we mean the relation of origin that exists between one Divine Person and another, or between one and the two others as its principle of origin. The latter truth will be specially treated here. A That the Holy Ghost proceeds from the Father has always been admitted by all Christians; the truth is expressly stated in John But the Greeks, after Photius, deny that He proceeds from the Son. And yet such is manifestly the teaching of Holy Scripture and the Fathers. These terms imply a relation of the Spirit to the Son, which can only be a relation of origin. This conclusion is so much the more indisputable as all admit the similar argument to explain why the Holy Ghost is called the Spirit of the Father. Augustine argues Tractate 99 on the Gospel of John, nos. Likewise you hear the Apostle declare: Could there then be two spirits, one the spirit of the Father, the other the spirit of the Son? Just as there is only one Father, just as there is only one Lord or one Son, so there is only one Spirit, Who is, consequently, the Spirit of both. Why then should you refuse to believe that He proceeds also from the Son, since He is also the Spirit of the

Son? If He did not proceed from Him, Jesus , when He appeared to His disciples after His Resurrection , would not have breathed on them, saying: What, indeed, does this breathing signify, but that the Spirit proceeds also from Him? Athanasius had argued in exactly the same way De Trinit. For he shall not speak of himself; but what things soever he shall hear, he shall speak; and the things that are to come, he shall shew you. He shall glorify me; because he shall receive of mine, and shall shew it to you. All things whatsoever the Father hath, are mine. Therefore I said, that he shall receive of mine, and shew it to you. What the Paraclete will receive from the Son is immanent knowledge , which He will afterwards manifest exteriorly. But this immanent knowledge is the very essence of the Holy Ghost.

Chapter 3 : The Danish Peace Academy, Avery, John: Malthus' Essay On The Principle Of Population

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Publication date The book *An Essay on the Principle of Population* was first published anonymously in 1798, [1] [2] but the author was soon identified as Thomas Robert Malthus. The book predicted a grim future, as population would increase geometrically, doubling every 25 years, [3] but food production would only grow arithmetically, which would result in famine and starvation, unless births were controlled. In essence, Malthus feared that continued population growth would lead to poverty and famine. This Act enabled the holding of a national census in England, Wales and Scotland, starting in 1801 and continuing every ten years to the present. In 1809, Malthus published a major revision to his first edition, as the same title second edition; [5] his final version, the 6th edition, was published in 1826. Overview Between 1798 and 1826 Malthus published six editions of his famous treatise, updating each edition to incorporate new material, to address criticism, and to convey changes in his own perspectives on the subject. Malthus also constructed his case as a specific response to writings of William Godwin and of the Marquis de Condorcet. Malthus regarded ideals of future improvement in the lot of humanity with skepticism, considering that throughout history a segment of every human population seemed relegated to poverty. He explained this phenomenon by arguing that population growth generally expanded in times and in regions of plenty until the size of the population relative to the primary resources caused distress: "This constant effort as constantly tends to subject the lower classes of the society to distress and to prevent any great permanent amelioration of their condition". *An Essay on the Principle of Population*. We will suppose the means of subsistence in any country just equal to the easy support of its inhabitants. The constant effort towards population The food therefore which before supported seven millions must now be divided among seven millions and a half or eight millions. The poor consequently must live much worse, and many of them be reduced to severe distress. The number of labourers also being above the proportion of the work in the market, the price of labour must tend toward a decrease, while the price of provisions would at the same time tend to rise. The labourer therefore must work harder to earn the same as he did before. During this season of distress, the discouragements to marriage, and the difficulty of rearing a family are so great that population is at a stand. In the mean time the cheapness of labour, the plenty of labourers, and the necessity of an increased industry amongst them, encourage cultivators to employ more labour upon their land, to turn up fresh soil, and to manure and improve more completely what is already in tillage, till ultimately the means of subsistence become in the same proportion to the population as at the period from which we set out. The situation of the labourer being then again tolerably comfortable, the restraints to population are in some degree loosened, and the same retrograde and progressive movements with respect to happiness are repeated. Malthus also saw that societies through history had experienced at one time or another epidemics, famines, or wars: "The power of population is so superior to the power of the earth to produce subsistence for man, that premature death must in some shape or other visit the human race. The vices of mankind are active and able ministers of depopulation. They are the precursors in the great army of destruction, and often finish the dreadful work themselves. But should they fail in this war of extermination, sickly seasons, epidemics, pestilence, and plague advance in terrific array, and sweep off their thousands and tens of thousands. Should success be still incomplete, gigantic inevitable famine stalks in the rear, and with one mighty blow levels the population with the food of the world. These findings are the basis for neo-malthusian modern mathematical models of long-term historical dynamics. If the subsistence for man that the earth affords was to be increased every twenty-five years by a quantity equal to what the whole world at present produces, this would allow the power of production in the earth to be absolutely unlimited, and its ratio of increase much greater than we can conceive that any possible exertions of mankind could make it Chapter 2, p 8 [7] This prediction is illustrated in the chart on the right. The chart also illustrates the current UN data on world population since 1950, and UN

projections for future growth. To date, world population has remained below his predicted line. However, the current rate of increase since is over two billion per 25 years, more than twice the Malthus predicted maximum rate. At the same time, world hunger has been in decline. The highest UN projection has population continuing at this rate and surpassing the Malthus predicted line. Proposed solutions Malthus argued that two types of checks hold population within resource limits: The positive checks include hunger, disease and war; the preventive checks, abortion, birth control, prostitution, postponement of marriage, and celibacy. For example, he satirically criticized the notion that agricultural improvements could expand without limit: It is probable that the gardeners who contend for flower prizes have often applied stronger dressing without success. At the same time, it would be highly presumptuous in any man to say, that he had seen the finest carnation or anemone that could ever be made to grow. He might however assert without the smallest chance of being contradicted by a future fact, that no carnation or anemone could ever by cultivation be increased to the size of a large cabbage; and yet there are assignable quantities much greater than a cabbage. No man can say that he has seen the largest ear of wheat, or the largest oak that could ever grow; but he might easily, and with perfect certainty, name a point of magnitude, at which they would not arrive. In all these cases therefore, a careful distinction should be made, between an unlimited progress, and a progress where the limit is merely undefined. Whether intellect could be communicated may be a matter of doubt; but size, strength, beauty, complexion, and perhaps longevity are in a degree transmissible As the human race, however, could not be improved in this way without condemning all the bad specimens to celibacy, it is not probable that an attention to breed should ever become general". Chapter IX, p 72 [7] In the second and subsequent editions Malthus put more emphasis on moral restraint. By that he meant the postponement of marriage until people could support a family, coupled with strict celibacy sexual abstinence until that time. Malthus emphasises the difference between government-supported welfare, and public charity. He proposed the gradual abolition of poor laws by gradually reducing the number of persons qualifying for relief. Relief in dire distress would come from private charity. In other words, the poor laws tended to "create the poor which they maintain. In the edition his concern for the poor shows in passages such as the following: Nothing is so common as to hear of encouragements that ought to be given to population. If the tendency of mankind to increase be so great as I have represented it to be, it may appear strange that this increase does not come when it is thus repeatedly called for. The true reason is, that the demand for a greater population is made without preparing the funds necessary to support it. Increase the demand for agricultural labour by promoting cultivation, and with it consequently increase the produce of the country, and ameliorate the condition of the labourer, and no apprehensions whatever need be entertained of the proportional increase of population. An attempt to effect this purpose in any other way is vicious, cruel, and tyrannical, and in any state of tolerable freedom cannot therefore succeed. In an addition to the edition he wrote: I have written a chapter expressly on the practical direction of our charity; and in detached passages elsewhere have paid a just tribute to the exalted virtue of benevolence. To those who have read these parts of my work, and have attended to the general tone and spirit of the whole, I willingly appeal, if they are but tolerably candid, against these charges On this subject, however, Malthus had written: In the First Edition of his Essay Malthus reasoned that the constant threat of poverty and starvation served to teach the virtues of hard work and virtuous behaviour. Malthus wrote that mankind itself was solely to blame for human suffering: And if, in endeavouring to obey the command to increase and multiply, [20] we people it only with beings of this latter description and suffer accordingly, we have no right to impeach the justice of the command, but our irrational mode of executing it. When the population of laborers grows faster than the production of food, real wages fall because the growing population causes the cost of living i. Difficulties of raising a family eventually reduce the rate of population growth, until the falling population again leads to higher real wages: It very rarely happens that the nominal price of labour universally falls; but we well know that it frequently remains the same, while the nominal price of provisions has been gradually rising. This, indeed, will generally be the case, if the increase of manufactures and commerce be sufficient to employ the new labourers that are thrown into the market, and to

prevent the increased supply from lowering the money-price. But an increased number of labourers receiving the same money-wages will necessarily, by their competition, increase the money-price of corn. This is, in fact, a real fall in the price of labour; and, during this period, the condition of the lower classes of the community must be gradually growing worse. But the farmers and capitalists are growing rich from the real cheapness of labour. Their increasing capitals enable them to employ a greater number of men; and, as the population had probably suffered some check from the greater difficulty of supporting a family, the demand for labour, after a certain period, would be great in proportion to the supply, and its price would of course rise, if left to find its natural level; and thus the wages of labour, and consequently the condition of the lower classes of society, might have progressive and retrograde movements, though the price of labour might never nominally fall. On the other hand, "preventive checks" to population that limited birthrates, such as later marriages, could ensure a higher standard of living for all, while also increasing economic stability. An Essay on the Principle of Population, as it affects the future improvement of society with remarks on the speculations of Mr. Condorcet , and other writers.. Second and much enlarged edition: An Essay on the Principle of Population; or, a view of its past and present effects on human happiness; with an enquiry into our prospects respecting the future removal or mitigation of the evils which it occasions. Malthus had a long extract from the article reprinted as A summary view of the Principle of Population. Condorcet , and Other Writers. William Godwin had published his utopian work Enquiry concerning Political Justice in , with later editions in and Also, Of Avarice and Profusion Godwin responded with Of Population This natural inequality of the two powers, of population, and of production of the earth, and that great law of our nature which must constantly keep their effects equal, form the great difficulty that appears to me insurmountable in the way to the perfectibility of society. The only authors from whose writings I had deduced the principle, which formed the main argument of the Essay, were Hume, Wallace, Adam Smith, and Dr. The exponential nature of population growth is today known as the Malthusian growth model. Note that Malthus actually used the terms geometric and arithmetic , respectively. Chapter 3 examines the overrun of the Roman empire by barbarians, due to population pressure. War as a check on population is examined. Chapter 4 examines the current state of populousness of civilized nations particularly Europe. Malthus criticises David Hume for a "probable error" in his "criteria that he proposes as assisting in an estimate of population. Chapter 6 examines the rapid growth of new colonies such as the former Thirteen Colonies of the United States of America. Chapter 7 examines checks on population such as pestilence and famine. Chapter 8 also examines a "probable error" by Wallace "that the difficulty arising from population is at a great distance. English wealth is compared with Chinese poverty. Chapters 18 and 19 set out a theodicy to explain the problem of evil in terms of natural theology. This views the world as "a mighty process for awakening matter" in which the Supreme Being acting "according to general laws" created "wants of the body" as "necessary to create exertion" which forms "the reasoning faculty". In this way, the principle of population would "tend rather to promote, than impede the general purpose of Providence. In the course of this enquiry I found that much more had been done than I had been aware of, when I first published the Essay. The poverty and misery arising from a too rapid increase of population had been distinctly seen, and the most violent remedies proposed, so long ago as the times of Plato and Aristotle. And of late years the subject has been treated in such a manner by some of the French Economists; occasionally by Montesquieu, and, among our own writers, by Dr.

Chapter 4 : An Essay on the Principle of Population

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In , Thomas Malthus wrote: Famine seems to be the last, the most dreadful resource of nature. The power of population is so superior to the power of the earth to produce subsistence for man, that premature death must in some shape or other visit the human race. The vices of mankind are active and able ministers of depopulation. They are the precursors in the great army of destruction, and often finish the dreadful work themselves. But should they fail in this war of extermination, sickly seasons, epidemics, pestilence, and plague advance in terrific array, and sweep off their thousands and tens of thousands. Should success be still incomplete, gigantic inevitable famine stalks in the rear, and with one mighty blow levels the population with the food of the world. An Essay on the Principle of Population. Rather, he believed that population growth was generally restricted by available resources: The passion between the sexes has appeared in every age to be so nearly the same that it may always be considered, in algebraic language, as a given quantity. The great law of necessity which prevents population from increasing in any country beyond the food which it can either produce or acquire, is a law so open to our view The different modes which nature takes to prevent or repress a redundant population do not appear, indeed, to us so certain and regular, but though we cannot always predict the mode we may with certainty predict the fact. A preventive check is a conscious decision to delay marriage or abstain from procreation based on a lack of resources. The primary examples of this are war , plague and famine. The steep rise in crop yields in the U. The percentage of growth was fastest in the early rapid growth stage. In developing countries maize yields are still rapidly rising. Ehrlich , Simon Hopkins, [5] and many others of an imminent Malthusian catastrophe. However, populations of most developed countries grew slowly enough to be outpaced by gains in productivity. By the early 21st century, many technologically developed countries had passed through the demographic transition , a complex social development encompassing a drop in total fertility rates in response to various fertility factors , including lower infant mortality , increased urbanization , and a wider availability of effective birth control. On the assumption that the demographic transition is now spreading from the developed countries to less developed countries , the United Nations Population Fund estimates that human population may peak in the late 21st century rather than continue to grow until it has exhausted available resources. Food per person increased since The graph of annual growth rates at the top of the page does not appear exactly as one would expect for long-term exponential growth. For exponential growth it should be a straight line at constant height, whereas in fact the graph from to is dominated by an enormous hump that began about , peaked in the mids, and has been steadily eroding away for the last 40 years. The sharp fluctuation between and was due to the combined effects of the Great Leap Forward and a natural disaster in China. Though short-term trends, even on the scale of decades or centuries, cannot prove or disprove the existence of mechanisms promoting a Malthusian catastrophe over longer periods, the prosperity of a major fraction of the human population at the beginning of the 21st century, and the debatability[citation needed] of the predictions for ecological collapse made by Paul R. Ehrlich in the s and s, has led some people, such as economist Julian L. Simon , to question its inevitability. Empirical estimates show that public policy taxes or the establishment of more complete property rights can promote more efficient consumption and investment that are sustainable in an ecological sense; that is, given the current relatively low population growth rate, the Malthusian catastrophe can be avoided by either a shift in consumer preferences or public policy that induces a similar shift. A study [12] by the UN Food and Agriculture Organization predicts that world food production will be in excess of the needs of the human population by the year ; however, that source also states that hundreds of millions will remain hungry presumably due to economic realities and political issues. Criticism[edit] Karl Marx and Friedrich Engels

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argued that Malthus failed to recognize a crucial difference between humans and other species. In capitalist societies, as Engels put it, scientific and technological "progress is as unlimited and at least as rapid as that of population". George noted that humans are distinct from other species, because unlike most species humans can use their minds to leverage the reproductive forces of nature to their advantage. He wrote, "Both the jayhawk and the man eat chickens; but the more jayhawks, the fewer chickens, while the more men, the more chickens. Eversley observed that Malthus appeared unaware of the extent of industrialization, and either ignored or discredited the possibility that it could improve living conditions of the poorer classes.

Chapter 5 : Predator-prey model - Scholarpedia

The Collected Works of William Hazlitt, Vol. 4 of A Reply to Malthus, the Spirit of the Age, Etc (Classic Reprint) Published January 6th by Forgotten Books Paperback, pages.

The education of Malthus T. In a later edition, published in , he buttressed this assertion with carefully collected demographic and sociological data from many societies at various periods of their histories. The optimism which preceded the French Revolution, and the disappointment which followed a few years later, closely paralleled the optimistic expectations of our own century, in the period after the Second World War, when it was thought that the transfer of technology to the less developed parts of the world would eliminate poverty, and the subsequent disappointment when poverty persisted. Science and technology developed rapidly in the second half of the twentieth century, but the benefits which they conferred were just as rapidly consumed by a global population which today is increasing at the rate of one billion people every fourteen years. Thomas Robert Malthus came from an intellectual family: His father, Daniel Malthus, was a moderately well-to-do English country gentleman, an enthusiastic believer in the optimistic ideas of the Enlightenment, and a friend of the philosophers Henry Rousseau, David Hume and William Godwin. The famous book on population by the younger Malthus grew out of conversations with his father. Daniel Malthus attended Oxford, but left without obtaining a degree. This was later sutured, and apart from a slight scar which marked the operation, he became very handsome. Robert Malthus was at first tutored at home; but in , when he was 16 years old, he was sent to study at the famous Dissenting Academy at Warrington in Lancashire. When Robert was 18, Wakefield arranged for him to be admitted to Jesus College, Cambridge University, as a student of mathematics. Robert Malthus graduated from Cambridge in with a first-class degree in mathematics. He was Ninth Wrangler, which meant that he was the ninth-best mathematician in his graduating class. He also won prizes in declamation, both in English and in Latin, which is surprising in view of the speech defect from which he suffered all his life. He was assigned as Curate to Okewood Chapel in Surrey. They lived in low thatched huts made of woven branches plastered with mud. The floors of these huts were of dirt, and the only light came from tiny window openings. The children of these cottagers developed late, and were stunted in growth. It was probably this fact which first turned his attention to the problem of population. By this time, Daniel Malthus had sold the Rookery; and after a period of travel, he had settled with his family at Albury, about nine miles from Okewood Chapel. Robert Malthus lived with his parents at Albury, and it was here that the famous debates between father and son took place. In this book, Godwin predicted a future society where scientific progress would liberate humans from material want. Godwin predicted that in the future, with the institution of war abolished, with a more equal distribution of property, and with the help of scientific improvements in agriculture and industry, much less labour would be needed to support life. Luxuries are at present used to maintain artificial distinctions between the classes of society, Godwin wrote, but in the future values will change; humans will live more simply, and their efforts will be devoted to self-fulfillment and to intellectual and moral improvement, rather than to material possessions. With the help of automated agriculture, the citizens of a future society will need only a few hours a day to earn their bread. They are alike hostile to intellectual improvement. The other vices of envy, malice, and revenge are their inseparable companions. In a state of society where men lived in the midst of plenty, and where all shared alike the bounties of nature, these sentiments would inevitably expire. The narrow principle of selfishness would vanish. No man being obliged to guard his little store, or provide with anxiety and pain for his restless wants, each would lose his own individual existence in the thought of the general good. No man would be the enemy of his neighbor, for they would have nothing to contend; and of consequence philanthropy would resume the empire which reason assigns her. Mind would be delivered from her perpetual anxiety about corporal support, and free to expatiate in the field of thought which is congenial to her. Each man would assist the inquiries of all. Political Justice is an enthusiastic vision of what humans could be like at some future period when the

trend towards moral and intellectual improvement has lifted men and women above their their present state of ignorance and vice. Much of the savage structure of the penal system would then be unnecessary, Godwin believed. At the time when he was writing, there were more than a hundred capital offenses in England, and this number had soon increased to almost two hundred. The theft of any object of greater value than ten shillings was punishable by hanging. But human behavior is produced by environment and education, Godwin pointed out. If the conditions of upbringing were improved, behavior would also improve. The causes of poverty, ignorance, vice and crime should be removed. Human failings should be cured rather than punished. He compared humans with animals, and found many common traits. Condorcet believed that animals are able to think, and even to think rationally, although their thoughts are extremely simple compared with those of humans. He also asserted that humans historically began their existence on the same level as animals and gradually developed to their present state. Since this evolution took place historically, he reasoned, it is probable, or even inevitable, that a similar evolution in the future will bring mankind to a level of physical, mental and moral development which will be as superior to our own present state as we are now superior to animals. In his *Esquisse*, Condorcet called attention to the unusually long period of dependency which characterizes the growth and education of human offspring. This prolonged childhood is unique among living beings. It is needed for the high level of mental development of the human species; but it requires a stable family structure to protect the young during their long upbringing. Thus, according to Condorcet, biological evolution brought into existence a moral precept, the sanctity of the family. Similarly, Condorcet maintained, larger associations of humans would have been impossible without some degree of altruism and sensitivity to the suffering of others incorporated into human behavior, either as instincts or as moral precepts or both; and thus the evolution of organized society entailed the development of sensibility and morality. Condorcet believed that ignorance and error are responsible for vice; and he listed what he regarded as the main mistakes of civilization: Condorcet believed the hereditary transmission of power to be the source of much of the tyranny under which humans suffer; and he looked forward to an era when republican governments would be established throughout the world. Turning to the inequality between men and women, Condorcet wrote that he could see no moral, physical or intellectual basis for it. He called for complete social, legal, and educational equality between the sexes. Condorcet predicted that the progress of medical science would free humans from the worst ravages of disease. Furthermore, he maintained that since perfectibility is possible, Condorcet believed that the intellectual and moral faculties of man are capable of continuous and steady improvement; and he thought that one of the most important results of this improvement will be the abolition of war. As Daniel Malthus talked warmly about Godwin, Condorcet, and the idea of human progress, the mind of his son, Robert, turned to the unbalance between births and deaths which he had noticed among his parishioners at Okewood Chapel. He pointed out to his father that no matter what benefits science might be able to confer, they would soon be eaten up by population growth. Regardless of technical progress, the condition of the lowest social class would remain exactly the same: The poor would continue to live, as they always had, on the exact borderline between survival and famine, clinging desperately to the lower edge of existence. For them, change for the worse was impossible since it would loosen their precarious hold on life; their children would die and their numbers would diminish until they balanced the supply of food. But any change for the better was equally impossible, because if more nourishment should become available, more of the children of the poor would survive, and the share of food for each of them would again be reduced to the precise minimum required for life. Observation of his parishioners at Okewood had convinced Robert Malthus that this sombre picture was a realistic description of the condition of the poor in England at the end of the 18th century. It was published anonymously in 1798, and its full title was *An Essay on the Principle of Population, as it affects the future improvement of society, with remarks on the speculations of Mr. Condorcet, and other writers*. That population does invariably increase, where there are means of subsistence, the history of every people who have ever existed will abundantly prove. And that the superior power cannot be checked without producing misery and vice, the ample portion of these two bitter ingredients in the cup of human life, and the

continuance of the physical causes that seem to have produced them, bear too convincing a testimony. In order to show that, in the long run, no improvement in agriculture could possibly keep pace with unchecked population growth, Malthus allowed that, in England, agricultural output might with great effort be doubled during the next quarter century; but during a subsequent year period it could not again be doubled. The growth of agricultural output could at the very most follow an arithmetic linear progression, 1,2,3,4,5,6. Because of the overpoweringly greater numbers which can potentially be generated by exponential population growth, as contrasted to the slow linear progression of sustenance, Malthus was convinced that at almost all stages of human history, population has not expanded freely, but has instead pressed painfully against the limits of its food supply. Malthus classified both war and birth control as a forms of vice. Occasionally the food supply increases through some improvement in agriculture, or through the opening of new lands; but population then grows very rapidly, and soon a new equilibrium is established, with misery and vice once more holding the population in check. In 1798, the mood had been optimistic; but by 1804, hopes for reform had been replaced by reaction and pessimism. Godwin several times invited Malthus to breakfast at his home to discuss social and economic problems. After some years, however, the friendship between Godwin and Malthus cooled, the debate between them having become more acrimonious. In 1800, Godwin published a reply to his critics, among them his former friends James Mackintosh and Samuel Parr, by whom he recently had been attacked. His Reply to Parr also contained a reply to Malthus: Godwin granted that the problem of overpopulation raised by Malthus was an extremely serious one. However, Godwin wrote, all that is needed to solve the problem is a change of the attitudes of society. Godwin suggested that each marriage should be allowed only two or three children or whatever number might be needed to balance the current rates of mortality and celibacy. This duty to society, Godwin wrote, would surely not be too great a hardship to be endured, once the reasons for it were thoroughly understood. He therefore traveled widely, collecting data. He also made use of the books of explorers, such as Cook and Vancouver. Malthus second edition - more than three times the length of his original essay on population - was ready in 1803. In his first chapter, Malthus stressed the potentially enormous power of population growth contrasted the slow growth of the food supply. He concluded that strong checks to the increase of population must almost always be operating to keep human numbers within the bounds of sustenance. He classified the checks as either preventive or positive, the preventive checks being those which reduce fertility, while the positive checks are those which increase mortality. In the following chapters of Books I, Malthus showed in detail the mechanisms by which population is held at the level of sustenance in various cultures. He first discussed primitive hunter-gatherer societies, such as the inhabitants of Tierra del Fuego, Van Diemens Land and New Holland, and those tribes of North American Indians living predominantly by hunting. In hunting societies, he pointed out, the population is inevitably very sparse: The tribes of hunters, like beasts of prey, whom they resemble in their mode of subsistence, will consequently be thinly scattered over the surface of the earth. Like beasts of prey, they must either drive away or fly from every rival, and be engaged in perpetual contests with each other. The neighboring nations live in a perpetual state of hostility with each other. The very act of increasing in one tribe must be an act of aggression against its neighbors, as a larger range of territory will be necessary to support its increased numbers. The contest will in this case continue, either till the equilibrium is restored by mutual losses, or till the weaker party is exterminated or driven from its country. Their object in battle is not conquest but destruction. Malthus concluded that among the American Indians of his time, war was the predominant check to population growth, although famine, disease and infanticide each played a part. According to Cook, the New Zealanders practiced both ceaseless war and cannibalism; and population pressure provided a motive for both practices.

Chapter 6 : Malthusian catastrophe - Wikipedia

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Thomas Robert Malthus, Robert Malthus he went by his middle name, [n] was born in "the Rookery", a country estate in Dorking, Surrey south of London. He was the second son of Daniel Malthus, a country gentleman, an Enlightenment enthusiast of liberal views, who left a remarkable imprint on his son.. Daniel was an avid disciple of Jean-Jacques Rousseau and David Hume both of whom he knew personally , accordingly, Robert Malthus was initially educated according to Rousseauvian precepts by his father and a series of tutors no fan of formal education, Daniel Malthus himself had studied at Oxford , but left without a degree "because of a contempt for the distinction". Malthus achieved the rank of 9th Wrangler in the Mathematical Tripos in , and was ordained that same year as a minister of the Church of England in He earned his M. Malthus was elected Fellow of Jesus College in June not as sometimes stated , and consequently divided his time between Cambridge and Albury. He eventually published it as an anonymous pamphlet, with the title *Essay on the Principle of Population* In this famous work, Malthus posited his hypothesis that the natural unchecked rate of population growth always exceeds the growth of means of subsistence. This implied that actual checked population growth is kept in line with food supply growth by "positive checks" starvation, disease and the like, elevating the death rate and "preventive checks" i. Because of this tendency, any attempt to ameliorate the condition of the lower classes by increasing their incomes or improving agricultural productivity would be fruitless, as the extra means of subsistence would be completely absorbed by an induced boost in population. As long as this tendency remains, Malthus argued, the improvement and "perfectibility" of society will always be out of reach. The future of mankind, Malthus pessimistically concluded, would always be marred by "misery and vice". He published his tract on the High Price of Provisions, announcing a new edition of the *Essay* was on the way. In , with hostilities suspended by the Peace of Amiens, Malthus did a quick tour of France and Switzerland. Malthus concentrated on bringing the empirical evidence gathered from his travels to bear. He also introduced the possibility of "moral restraint" voluntary abstinence which leads to neither misery nor vice bringing the unchecked population growth rate down to a point where the tendency is gone. In practical policy terms, this meant inculcating the lower classes with middle-class virtues, which he believed was to be primarily done by urging and preaching to the poor to change their improvident habits. He also conjectured the ennoblement of the proletariat could be furthered along with the introduction of universal suffrage, state-run education for the poor and, more controversially, the elimination of the Poor Laws and the establishment of an unfettered nation-wide labor market, so that the poor would fear falling and aspire to rise. Malthus also tentatively suggested that once the poor had "a taste for the comforts and conveniences of life", then they would demand a higher standard of living for themselves before starting a family. The *Essay* transformed Malthus into an intellectual celebrity. Even his severest critics grudgingly acknowledged his *Essay* for what it was: Of all his critics on population, Malthus deigned only to reply in print anonymously to William Godwin in the *Edinburgh Review*. In , Malthus got married and thereby forfeited his fellowship at Cambridge. Malthus got interested in monetary topics in , when he published a pamphlet much praised by Keynes , expounding an endogenous theory of money. Contrary to the Quantity Theory , Malthus argued that rising prices are followed by increases in the quantity supplied of money. Around , Malthus came across a series of tracts by a stockbroker, David Ricardo , on the bullionist controversy. He immediately wrote to Ricardo and the two men initiated a correspondence and a friendship that would last for over a decade. The Malthus-Ricardo relationship was warm in all respects but one -- economics. They found themselves on opposite sides of the fence on practically every economic question. Ricardo accepted the Malthusian population doctrine, and incorporated the Malthusian wage-fertility dynamics to pin down the "natural wage" in his treatise. Despite attempts to displace it later with the Wages

Fund theory, the "iron law of wages" would remain a part of the canonical long-run model of the Classical school. In 1805, Malthus launched himself into the Corn Laws debate then raging in parliament. After a first pamphlet, *Observations*, outlining the pros and cons of the proposed protectionist laws, Malthus tentatively supported the free traders, arguing that as cultivation as British corn was increasingly expensive to raise, it was best if Britain relied at least in part on cheaper foreign sources for its food supply. He changed his mind the next year, in his *Grounds of an Opinion* pamphlet, siding now with the protectionists. Foreign laws, he noted, often prohibit or raise taxes on the export of corn in lean times, which meant that the British food supply was captive to foreign politics. By encouraging domestic production, Malthus argued, the Corn Laws would guarantee British self-sufficiency in food. In his *Inquiry*, Malthus came up with the differential theory of rent. Refuting older contentions that rent was a cost of production, Malthus argued that it was merely a deduction from the surplus. Rent, Malthus argued, is enabled by three facts: Ricardo own essay was actually a response to Malthus. Malthus was never comfortable as a member of the Classical school. For instance, Malthus introduced the idea of a demand schedule in the modern sense, i. He also paid much attention to the short-run stability of prices. Malthus believed that economic crises were characterized by a general excess supply caused by insufficient consumption. His defense of the Corn Laws rested partly on the need for landlord consumption to "make up" for shortfalls in demand and thus avert crisis. See our more extensive discussion of the General Glut Controversy. Malthus was elected a fellow of the Royal Society in 1809, and was one of the founding members of the Political Economy Club in 1813, although he found the atmosphere there was not always congenial to his views, with James Mill poking at theories of value and underconsumption and McCulloch poking at his population theory. Malthus wrote a pamphlet on the Measure of Value, in 1813, reiterating his labor-commanded theory, contributed two articles to the Royal Society of Literature and gave evidence before a parliamentary committee on emigration in 1815. His population theory suffered a severe theoretical assault from Nassau William Senior in 1817, who insisted that aspirations of the working classes for higher standards of living for themselves could and did lead to voluntary curbing of birth rates. This prompted a brief correspondence where Malthus, in which Malthus almost conceded. As Senior himself pointed out, the demographic transition was a possibility that Malthus himself had originally proposed, even if he de-emphasized its practical importance and ignored its policy implications. Gambling in that direction, Malthus took an interest in the fledgling field of statistics and empirical economics, which empiricists William Whewell and Richard Jones were trying to promote at Cambridge. Malthus saw his main policy goal - the reform of the Poor Laws - finally accomplished by parliament in early 1817. Malthus died on December 23, 1820, while still in the process of editing a second edition of the *Principles* which came out posthumously in 1821. But it was J. McCulloch showed that birth rates had remained virtually unchanged, even declined a little in the late 1810s, that the explosion in population growth Malthus had attributed to rising birth rates was in fact due to steeply declining death rates. The debate was not altogether over - the Malthusian hypothesis was resumed again a decade later, and would continue to be discussed again at least until the turn of the century, and intermittently in the 20th Century. The Malthus hypothesis was finally integrated with the Senior hypothesis as two phases of a single model of "demographic transition". Major Works of T. Condorcet and Other Writers, Original edition:

Chapter 7 : CATHOLIC ENCYCLOPEDIA: Holy Ghost

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He came to the United States in and wrote a number of theoretical articles on chemical oscillations during the early decades of the twentieth century, and authored a book on theoretical biology. He then left academic science and spent the majority of his working life at an insurance company Metropolitan Life.

Vito Volterra (May 3, - October 11,), Italian, mathematician and physicist, best known for his contributions to mathematical biology, was born in Ancona, into a very poor family. Volterra showed early promise in mathematics before attending the University of Pisa. The most famous outcome of this period is the Lotka-Volterra model. In , he joined the opposition to the Fascist regime of Benito Mussolini and refused to take a mandatory oath of loyalty. He was compelled to resign his university post and membership of scientific academies, and, during the following years, he lived largely abroad, returning to Rome just before his death.

Kermack-McKendrick Model There is herd immunity in predation and in epidemics. It is convenient to frame this in terms of epidemiology where now we refer to the prey as being susceptibles and the predators as being infectives. Consider a time interval that is short compared to reproduction of the susceptible population, i . However, if this condition is not satisfied, the infective population will decrease.

Kermack-McKendrick model of propagation of infectious disease. This indicates the size of the susceptible population that avoids the infection. Surprisingly, this number is always greater than zero, which shows that some susceptibles will always survive! It reflects the fact that the susceptible population can be reduced to a level below which infectives will not increase. The model in this case is referred to as being the Kermack-McKendrick model of susceptible-infective interactions in epidemiology.

Jacob-Monod Model Another approach to modeling the interaction between prey and predators was developed to account as well for organisms such as bacteria taking up nutrients. There is a limited uptake rate that such organisms are capable of, and the next model accounts for limited uptake rates. This model was discovered independently in several diverse applications. It is akin to the Haldane-Briggs model and Michaelis-Menten model in biochemistry, the Jacob-Monod model in microbial ecology, and the Beverton-Holt model in fisheries. It serves as one of the important building blocks in studies of complex biochemical reactions and in ecology.

Smith and Waltman A typical use of this model is to describe a continuous-flow growth device, such as a chemostat, where there is continuous removal of nutrient and feeders and a continuous supply of fresh nutrient. The Jacob-Monod model is used to describe such a bacterial growth device, for example to determine conditions for a sustained dynamic equilibrium to exist by balancing growth due to uptake of nutrient with wash out of feeders. Some predator-prey models use terms similar to those appearing in the Jacob-Monod model to describe the rate at which predators consume prey. More generally, any of the data in the Lotka-Volterra model can be taken to depend on prey density as appropriate for the system being studied. This is referred to as a functional response, an idea that is introduced and discussed by C. Several different forms of functional response have been used in population models, but the Jacob-Monod form, also called the Holling type 2 form by ecologists, is one of the more common ones. Many other investigations of predator-prey models have involved functional responses. These and other functional responses are also discussed in May. Such mechanisms in the Lotka-Volterra model can stabilize or destabilize the system, for example resulting in predator extinction or in co-existence of prey and predators. This is in contrast to the plurality of cycles predicted by the original Lotka-Volterra model. The logistic equation can be solved in closed form by quadratures. To model age structure and other time delays in a system, we take the approach that was introduced by Euler in the 18th century. This nonlinearity might be due to predation or environmental factors, as discussed earlier. Its solution can be found using Laplace transforms.

Keyfitz and Flieger The other extreme occurs when fertility is focused all at one age, as for salmon or cicadas. This was first noticed by the ecologist W. The work was later rediscovered by Robert May, who stimulated the

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now prominent area of chaos Gleick We only start counting after 50 initial iterates to avoid transients. We plot this record looking from above, as shown in the figure Hoppensteadt and Hyman The solution always settles into some structure, which might be highly complex. At first, there is a unique stable state. This is in the range of chaotic dynamics. Holling, The characteristics of simple type of predation and parasitism, Canadian Entomologist 91 , A, , , Fact and Methods of Demography, W. Freeman, San Francisco, Lotka, Elements of physical biology. Williams and Wilkins, Baltimore, Shea-Brown Periodic orbit. Scholarpedia , 17: Philip Holmes and Eric T.

Chapter 8 : Issues, Etc. by Lutheran Public Radio on Apple Podcasts

An Examination of Opinions maintained in the 'Essay on the Principles of Population, by Malthus, and in the 'Elements of Political Economy' by Ricardo, with some remarks in reply to Sir James Graham's 'Address to the Land-owners', by J.C. Ross, , v.1, v

Petersen describes Daniel Malthus as "a gentleman of good family and independent means Warrington was a dissenting academy , which closed in ; Malthus continued for a period to be tutored by Gilbert Wakefield who had taught him there. There he took prizes in English declamation, Latin and Greek , and graduated with honours, Ninth Wrangler in mathematics. His tutor was William Frennd. Malthusian catastrophe Essay on the principle of population, Malthus came to prominence for his essay on population growth. In it, he argued that population multiplies geometrically and food arithmetically ; therefore, whenever the food supply increases, population will rapidly grow to eliminate the abundance. Between and he published six editions of An Essay on the Principle of Population , updating each edition to incorporate new material, to address criticism, and to convey changes in his own perspectives on the subject. Malthus also constructed his case as a specific response to writings of William Godwin " and of the Marquis de Condorcet " The Essay gave rise to the Malthusian controversy during the next decades. The content saw an emphasis on the birth rate and marriage rates. The neo-Malthusian controversy, or related debates of many years later, has seen a similar central role assigned to the numbers of children born. Malthus used the trip to gather population data. Otter later wrote a Memoir of Malthus for the second edition of his Principles of Political Economy. At the end of the proposed appointment of Graves Champney Houghton to the College was made a pretext by Randle Jackson and Joseph Hume to launch an attempt to close it down. Malthus wrote a pamphlet defending the College, which was reprieved by the East India Company in Malthus's Ricardo debate on political economy[edit] During the there took place a setpiece intellectual discussion within the proponents of political economy , often called the "Malthus's Ricardo debate", after the leading figures of Malthus and David Ricardo , a theorist of free trade , both of whom had written books with the title Principles of Political Economy. Under examination were the nature and methods of political economy itself, while it was simultaneously under attack from others. In The Nature of Rent , Malthus had dealt with economic rent , a major concept in classical economics. Ricardo defined a theory of rent in his Principles of Political Economy and Taxation Rent therefore represented a kind of negative money that landlords could pull out of the production of the land, by means of its scarcity. Malthus laid importance on economic development and the persistence of disequilibrium. He was drawn into considering political economy in a less restricted sense, which might be adapted to legislation and its multiple objectives, by the thought of Malthus. In his own work Principles of Political Economy , and elsewhere, Malthus addressed the tension, amounting to conflict, he saw between a narrow view of political economy, and the broader moral and political plane. If Malthus and Ricardo differed, it was a difference of men who accepted the same first principles. They both professed to interpret Adam Smith as the true prophet, and represented different shades of opinion rather than diverging sects. He emerged as the only economist of note to support duties on imported grain. By encouraging domestic production, Malthus argued, the Corn Laws would guarantee British self-sufficiency in food. He was also one of the first fellows of the Statistical Society , founded in March In he gave evidence to a committee of the House of Commons on emigration. In chapter 10, the penultimate chapter, he presented 60 numbered paragraphs putting forth terms and their definitions that he proposed, following those rules, should be used in discussing political economy. This collection of terms and definitions is remarkable for two reasons: Between these chapters, he criticized several contemporary economists's Jean-Baptiste Say , David Ricardo , James Mill , John Ramsay McCulloch , and Samuel Bailey "for sloppiness in choosing, attaching meaning to, and using their technical terms. McCulloch clearly felt his ox gored, and his review of Definitions is largely a bitter defence of his own Principles of Political Economy, [38] and his counter-attack "does little credit to his reputation", being largely "personal derogation"

of Malthus. He was buried in Bath Abbey. They had a son and two daughters. His firstborn, son Henry, became vicar of Effingham, Surrey, in 1771, and of Donnington, Sussex, in 1775; he married Sofia Otter, daughter of Bishop William Otter, and died in August 1781, aged 48. His middle child, Emily, died in 1782, outliving her parents and siblings. The youngest, Lucille, died unmarried and childless in 1783, months before her 18th birthday. An Essay on the Principle of Population Malthus argued in his Essay that population growth generally expanded in times and in regions of plenty until the size of the population relative to the primary resources caused distress: Yet in all societies, even those that are most vicious, the tendency to a virtuous attachment [i. This constant effort as constantly tends to subject the lower classes of the society to distress and to prevent any great permanent amelioration of their condition. An Essay on the Principle of Population. Malthus argued that two types of checks hold population within resource limits: The positive checks include hunger, disease and war; the preventive checks: These findings are the basis for neo-malthusian modern mathematical models of long-term historical dynamics. However, the margin of abundance could not be sustained as population grew, leading to checks on population growth: If the subsistence for man that the earth affords was to be increased every twenty-five years by a quantity equal to what the whole world at present produces, this would allow the power of production in the earth to be absolutely unlimited, and its ratio of increase much greater than we can conceive that any possible exertions of mankind could make it On the other hand, "preventive checks" to population that limited birthrates, such as later marriages, could ensure a higher standard of living for all, while also increasing economic stability. Difficulties of raising a family eventually reduce the rate of population growth, until the falling population again leads to higher real wages. In the second and subsequent editions Malthus put more emphasis on moral restraint as the best means of easing the poverty of the lower classes. An Essay on the Principle of Population, as it affects the future improvement of society with remarks on the speculations of Mr. Condorcet, and other writers.. Second and much enlarged edition: An Essay on the Principle of Population; or, a view of its past and present effects on human happiness; with an enquiry into our prospects respecting the future removal or mitigation of the evils which it occasions. Malthus had a long extract from the article reprinted as A summary view of the Principle of Population. The present high price of provisions[edit] In this work, his first published pamphlet, Malthus argues against the notion prevailing in his locale that the greed of intermediaries caused the high price of provisions. Instead, Malthus says that the high price stems from the Poor Laws, which "increase the parish allowances in proportion to the price of corn. But he concludes by saying that in time of scarcity such Poor Laws, by raising the price of corn more evenly, actually produce a beneficial effect. Observations on the effects of the Corn Laws[edit] Although government in Britain had regulated the prices of grain, the Corn Laws originated in 1800. At the end of the Napoleonic Wars that year, Parliament passed legislation banning the importation of foreign corn into Britain until domestic corn cost 80 shillings per quarter. It led to serious rioting in London and to the Peterloo Massacre in Manchester in 1819. He argued that given the increasing cost of growing British corn, advantages accrued from supplementing it from cheaper foreign sources. Second edition, posthumously published. A letter to Samuel Whitbread, Esq. Johnson and Hatchard, London. Edinburgh Review 11, January, 1800. Newneham and others on the state of Ireland. Edinburgh Review 12, July, 1800. Newneham on the state of Ireland, Edinburgh Review 14 April, 1800. Depreciation of paper currency. Edinburgh Review 17, February, 1800. Pamphlets on the bullion question. Edinburgh Review 18, August, 1800. A letter to the Rt. Statement respecting the East-India College. Edinburgh Review 35, July, 1800. The Measure of Value, stated and illustrated Quarterly Review, 29 57, April, 1800. Quarterly Review 30 60, January, 1800. On the measure of the conditions necessary to the supply of commodities. On the meaning which is most usually and most correctly attached to the term Value of a Commodity. Reception and influence[edit] Further information: Discounted at the time, this theory foreshadowed later works of an admirer, John Maynard Keynes. In popular culture[edit] This article appears to contain trivial, minor, or unrelated references to popular culture. Unsourced material may be challenged and removed. January Ebenezer Scrooge from A Christmas Carol by Charles Dickens, represents the perceived ideas of Malthus, [56] famously illustrated by his explanation as to why he refuses to donate to the poor and

destitute: In general, Dickens had some Malthusian concerns evident in *Oliver Twist*, *Hard Times* and other novels, and he concentrated his attacks on Utilitarianism and many of its proponents, like Bentham, whom he thought of, along with Malthus, as unjust and inhumane people. The women, therefore, carry contraceptives with them at all times in a "Malthusian belt". In the television show *Wiseguy*, Kevin Spacey played Mel Proffitt, a self-professed "Malthusian" who quotes Thomas Malthus and keeps a bust of his likeness on display. At the end of *Urinetown*, a Broadway musical about a dystopia where, in response to a devastating drought, people too poor to pay for restroom usage are killed as a means of population control, Officer Lockstock cries "Hail, Malthus! In the video game *Victoria 2* the player can research the technology "Malthusian Thought" as a benefit to their country. In *Infinity War*, the main villain called Thanos appears to be motivated by Malthusian views about population growth. The epitaph of Rev. Thomas Robert Malthus, just inside the entrance to Bath Abbey. The epitaph of Malthus in Bath Abbey reads [with commas inserted for clarity]: One of the best men and truest philosophers of any age or country, raised by native dignity of mind above the misrepresentation of the ignorant and the neglect of the great, he lived a serene and happy life devoted to the pursuit and communication of truth, supported by a calm but firm conviction of the usefulness of his labours, content with the approbation of the wise and good. His writings will be a lasting monument of the extent and correctness of his understanding. The spotless integrity of his principles, the equity and candour of his nature, his sweetness of temper, urbanity of manners and tenderness of heart, his benevolence and his piety are still dearer recollections of his family and friends. Born February 14, - Died 29 December

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This is hypothetical only, not my prediction of future events. Historically, global food supply has matched global population, allowing the population to grow. In the future, demographic transition is supposed to stabilise global population growth - see Human Replicators - An Exponentialist View for more. An important point to note is that, whatever happens, our global human population and its available food supply can be expected to stay fairly close to 1: Because, as the agricultural and industrial revolutions and the green revolution have taught us, we are highly capable as a species of increasing the means of our own subsistence. Yet as already noted this does not mean that we can go on increasing indefinitely on Earth, otherwise our population and food needed to supply it would weigh more than the Earth itself clearly impossible if we are restricted to Earth. In the meantime, if there is a collapse in the food supply or the population, the ratio would soon balance out at roughly 1: Historically, population doubling times and available food supply have kept pace with each other and have done so at variable doubling periods. Whatever happens, it is certain that we can expect our global population and its food supply to obey the same universal law of nature that they always have. Namely, growth or shrinkage comparable to exponential growth or shrinkage, but based on variable rates of compound interest not any constant rate of growth or shrinkage. Hence, doubling periods and halving periods will also be variable. This is what the Couttsian Growth Model explains, when looking at the history of any population of any species. This is what the Couttsian Growth Model predicts for the future of any population of any species. Each seed had been marked, and Darwin was able to determine that of the seeds were destroyed by slugs and insects. Even though Darwin does not provide a comparative study in which the seedlings are choked by other plants, I would conclude that Darwin has proven Malthus wrong in asserting which is the "greatest check". The greatest check to life is Life is consumed by other life. Still, nobody would argue that "want of room and nourishment" are insignificant checks. The most important point, to reiterate, is that rates of growth vary. Generally speaking, he would also be right in assuming that higher rates of growth would accompany locations with a greater supply of sustenance. Both the slugs and insects would find themselves in a situation where both room and nourishment the plant seeds were abundant. Static plant seeds being much easier to count than slugs and insects, Darwin only provided figures for the plant seeds. Differential Replication In considering what I term differential replication, Malthus wrote Malthus, These differences will be further increased by the employments of the people, their habits of cleanliness, and their care in preventing the spread of epidemics. If in no country was there any difficulty in obtaining the means of subsistence, these different degrees of healthiness would make great difference in the progress of population; But as the actual progress of population is, with very few exceptions, determined by the relative difficulty of procuring the means of subsistence, and not by the relative natural powers of increase, it is found by experience that, except in extreme cases, the actual progress of population is little affected by unhealthiness or healthiness However, what these lines do prove is that Malthus clearly understood that many factors would play a part in producing the growth rate for any particular population, and that these factors would vary from population to population. This, he foresaw, would lead to variable growth rates. Although Malthus is discussing human populations in this passage, most of what he said would also apply to any life-form. Malthus believed in the God-given immutability of species, and would have firmly believed along with most of his contemporaries that "All men are created equal With the human genome now revealed, and the genetic nature of some diseases understood, few people would now literally hold this Truth to be self-evident any more. Malthus lived a long time before knowledge of heredity or genetics became available. These days, differential replication is normally attributed to genetic factors. The mutability of species allow them to gradually adapt over vast stretches of time to their environment, and gain or lose a reproductive edge over competitors - this is Natural Selection. Those which gain an advantage will increase in number, and those which lose an advantage

will decrease in number and be driven to extinction. Differential replication ranks alongside Natural Selection in modern evolutionary theory. The existence of variable rates of growth, regardless of the cause of the variation, leads to the principle of differential replication. Differential replication essentially boils down to a competition between populations with different growth rates. So, whilst Malthus was incorrect due to his ignorance of knowledge yet to be discovered to assert that the " I assert that, whether you believe in Creationism, or Evolution, differential replication must still be explained. This is something which is very lightly explored in most defences of evolutionary theory, which mostly focus on natural selection rather than differential replication. Creationists do not even use the explanation provided for them by Malthus. Both camps could learn something about differential replication from Malthus. For the moment, regardless of your preconceptions, forget all the arguments. Assume that all species simply exist, with no need to explain why. Now it still remains to explain why some populations increase, some remain stable, and some decrease and eventually go extinct. Malthusian Selection It might surprise some Creationists to realise that Malthus, an English clergyman, provided the only common ground they inevitably share with Evolutionists. There was no Wallace or Darwin to argue against the fixity of species. If all humans were identical genetic clones hence no genetic cocktail mixed via sexual recombination with no possibility of genetic mutation, then differential replication would still apply simply due to the variable environmental circumstances of distinct populations. In our hypothetical situation, some populations would have adequate water and food, and some would not. Depending upon available shelter and the local weather, some might suffer from too much heat, or not enough. Some might get too wet. Some would suffer local plagues. Some clone populations would be more successful at waging war on other clone populations. Consequently, some populations will grow faster than others, some will remain stable, and some will decline. Recorded human history would certainly confirm that populations living close to fresh water grew so rapidly that civilisation was often the result. Without actually using the term "clone", this is still pretty much what Malthus thought. This form of differential replication is what I call Malthusian Selection. It is environmental and behavioural selection on the reproductive success of a population. It is a much more short-term form of selection than Natural Selection, but constantly applies. What Wallace and Darwin realised, which Malthus did not, was that variability within a species also played a huge role in providing small advantages and disadvantages within a species, and even between competing species e. Though genetics was undiscovered at the time, they both also realised that such variability was hereditary. Hence, species would gradually evolve into new species. Both men realised that old and new species would then face a survival of the fittest contest, over time, which would frequently result in the extinction of either the old or new species. Both men therefore realised that this slow process would favour changes which improved a species in the contest of differential replication. The First Exponentialist Malthus introduced the concept of considering discrete populations at different locations e. He introduced the concept of a natural trend towards exponential growth for the human species, simply and accurately illustrated through the standard exponential population doubling series and population doubling times. He briefly explored the exponential growth of non-human species. He postulated non-exponential growth rates for food production within the limited resources of the different locations used. In essence, he introduced the concept of Limits To Growth. He insists that this natural state has always existed, and always will Malthus, Malthus failed to recognise the role of science and technology in not just sustaining a population, but causing that population to grow exponentially. Although he did consider human life-span extension in his essay, he failed to explore any of the possibilities whereby " Some of these oversights are perhaps " due to the fact that he was a man of his age. Few people then considered the possibility of colonising space, or changing our physical constitution, as anything more than a fantasy. Malthus does not take the usual generational view of populations so common to most writers on the subject before or since. Virtually every exponentialist since Malthus has ignored this salutary lesson, and instead they fall into the trap of considering population growth from one generation to the next. I have dubbed this failing in other exponentialists as generational chauvinism. Just read some of the articles on other exponentialists and you will get my point. Malthus was a pioneer in this sense, rarely

matched. Malthus, like so many others since, used a simple model of exponential growth which used a constant growth rate. Today, we know that any positive rate of growth however variable from year to year will result in the exponential growth of the population in question. Variable growth rates therefore result in variable population doubling times. This more sophisticated population growth model is known as The Couttsian Growth Model. I therefore feel justified in claiming that Malthus was the first true exponentialist. The Finest Minds Here, Malthus philosophises about the nature of original thinking, and the finest minds Malthus, Could we suppose the period arrived, when there was not further hope of future discoveries, and the only employment of mind was to acquire pre-existing knowledge, without any efforts to form new and original combinations, though the mass of human knowledge were a thousand times greater than it is at present, yet it is evident that one of the noblest stimulants to mental exertion would have ceased; the finest feature of intellect would be lost; everything allied to genius would be at an end; and it appears to be impossible, that, under such circumstances, any individuals could possess the same intellectual energies as were possessed by a Locke, a Newton, or a Shakespeare, or even by a Socrates, a Plato, an Aristotle or a Homer. His was one of the finest minds. Of course, as Hart states, the list is his personal assessment and he invites the reader to create his or her own list. Hart correctly notes that Malthus himself did not advocate contraception, but preferred to advocate his own suggestion of "moral restraint". It should be noted that both are important checks on population. Yet modern evolutionary theory, including Darwinism, is underpinned by the Malthusian Principle Of Population. Perhaps then, Malthusians should be grateful that Malthus is listed at number 80? He notes that the Linnaean Society of London only recently 28th May, unveiled a portrait of Wallace alongside that of Charles Darwin. See Wallace - An Exponentialist View for more. Conclusion I am grateful to John G. Wilson for his book, and his efforts to restore the reputation of Wallace. I am not descended from the Reverend Malthus, and have no family honour to restore in the case for Malthus. Nonetheless, I hope that the series of articles that I have written for the Exponentialist web site will have a similar effect in restoring the scientific reputation of a reluctant scientist - the Reverend Thomas Malthus.