Royal Investigations of the Origin of Language

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Royal Investigations of the Origins of Language

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Introduction

Students of language development in children are familiar with accounts of three isolation experiments, that is, experiments in which infants are isolated in order to discover whether they have a natural tendency to create language and, if so, what sort of language. These experiments are alleged to have been carried out (in chronological order) by Psamtik I of Egypt. Frederick II (Hohenstaufen) of Sicily, and James IV of Scotland (cf. Marx, 1967, p. 443, 450-51; Blumenthal, 1970, p. 100).

In view of the present revival of interest in the origins of language, it has seemed to us timely to examine these ancient investigations from two points of view. First of all, there is the question of authentication: did they indeed take place and, if so, how were they conducted and what were their outcomes? In the second place, what light do they shed on the genetic question to which they were addressed, viz., what is the nature of spontaneously created language? In the course of our research we stumbled upon a fourth royal investigation, that of Akbar the Great, 16th-century ruler of Moghul India. This isolation study is not well-known (see sect. 4 below) and deserves to be better known. In addition, although accounts of the three earlier experiments are commonplace, they are seldom accurate and never accompanied by full texts and bibliographic details of source materials. For these reasons we feel that it is worthwhile to provide contemporary students of child language with a convenient and comprehensive guide to the origins, weird and wonderful though they be, of their subject.

We will proceed in the following manner. For each experiment we will give the primary source-texts (in translation) and refer to any principal secondary texts. After commenting on these texts we will discuss the question of <u>authenticity</u>. A natural further step is to consider the plausibility of these investigations. That is, to ask whether it is plausible that the individual in question should have carried out such a study. As we show below, it turns out that plausibility is a highly unreliable guide to authenticity. There are two grounds for this claim. The first is an *a priori* argument:[1] an individual who is known for empirical inquisitiveness and an interest in genetic or linguistic questions is not only more likely to carry out isolation experiments than other individuals, he is also more likely to have such experiments <u>falsely</u> attributed to him by garrulous and imaginative chroniclers (whether motivated by malice, a desire to 'gild the lily' or a simple wish to make their books more interesting).

The second ground is empirical: plausibility and authenticity are simply not correlated in

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[1]

the cases discussed.

Finally, we will consider whether these experiments illuminate the genetic question in any way and briefly review the possibility of investigating this question by less barbarous methods.

1. The experiment of Psamtik (Psammetichus) I of Egypt

1.1 Sources

We know of this experiment only through Herodotus' account[2] . Psamtik lived from 663 to 610 B.C., and Herodotus from 485 to 425. His account is based upon what he was told by the priests of Hephaestus at Memphis. It runs as follows:

> 'Now until Psammetichus reigned over them, the Egyptians believed that they were the eldest of all men. But ever since Psammetichus became king and resolved to learn who were indeed the eldest, they have believed that the Phrygians were before them, but they themselves before the rest. For when Psammetichus was not able by enquiring to learn the answer from any man, he conceived this device. He gave two new-born babes of ordinary men to a shepherd, to nurture among his flocks after this manner. He charged him that none should utter any speech before them, but they should live by themselves in a solitary habitation; and at the due hours the shepherd should bring goats to them, and give them their fill of milk, and perform the other things needful. Thus Psammetichus did and commanded because he desired, when the babes should be past meaningless whimperings, to hear what tongue they would utter first. And these things came to pass; for after the shepherd had wrought thus for a space of two years, when he opened the door and entered in, both the babes fell down before him, and cried *becos*, and stretched out their hands. Now when the shepherd heard it the first time, he held his peace; but when this word was oftentimes spoken as he came to care for them, then he told his lord, and brought the children into his presence when he commanded. And when Psammetichus had also heard it, he enquired which nation called anything *becos*; and enquiring, he found that the Phrygians call bread by this name. Thus the Egyptians, guided by this sign, confessed that the Phrygians were elder than they. That so it came to pass I heard of the priests of Hephaestus in Memphis.'

Psamtik is thus thought to have believed that isolated children would speak the language of their aboriginal ancestors. This belief is presented as an assumption to be used in interpreting the experimental outcome, not as an hypothesis itself requiring empirical confirmation. It is characteristic of early writing on the subject of language origins that some <u>particular</u> language (perhaps 'dead' but in some way identifiable) should be regarded as the original. A particularly clear example of this assumption is provided by the following passage from the *Wibhanga Atuwaba* (cf. Hardy, 1966, p. 23), an ancient Singhalese

Buddhist text:

> 'Parents place their children when young either on a cot or a chair, and speak different things, or perform different actions. Their words are thus distinctly fixed by their children (on their minds) thinking that such was said by him and such by the other; and in process of time they learn the entire language. If a child, born of a Damila mother and an Andhaka father, should hear his mother speak first, he would learn the Damila language. but if he should hear his father first, he would speak the Andhaka. If, however, he should not hear either of them, he would speak the Magadhi. If, again, a person in an uninhabited forest in which no speech is heard, should intuitively attempt to articulate words, he would speak the very Magadhi.'

Psamtik is credited with having found it necessary to isolate two children (contra the *gedanken*-experiments in the *Wibhanga Atuwaba*), suggesting perhaps that he thought that language would not be developed without some society. However, it is also possible that the use of two subjects may have been merely a precaution against inadvertent mortality. In any event, the outcome of the experiment, as reported, was hardly sufficient to bear the weight of the inference that ensued. Some have argued that *becos* might have been modelled upon the bleating of the goats (cf. Lloyd, 1976, p. 5; Sennert, 1643, sect.VI; Farrar, 1865, p. 13), but this seems equally tendentious and futile. It is interesting that Psamtik is supposed to have asked in what tongue is there anything called *becos* rather than in what tongue is there something called *becos* which would fit the occasion of utterance. What would he have said if his advisers had informed him that *becos* was Egyptian for the tusk of an elephant? Could it be that semantic emptiness or lability in the Original Language was considered possible but that phonological change was not? At any rate it is clear that a latent *Ursprache* (perhaps consisting only of a collection of meaningless phonological forms) was assumed to be present in the minds of the children by Psamtik (or by the fabricators of the tale, if it was indeed only legendary).

1.2 Authenticity

Herodotus' report of this experiment has several features that might incline one to accept it as genuine. It bristles with impressive detail, the design shows remarkable sophistication (secure isolation, newborn children, minimal caregiving, awareness of babbling, etc.) and the outcome was presumably unwelcome to the Egyptians (they knew perfectly well who were the oldest people!). However, accepting it as genuine is quite unjustified. A recent commentary on Book II (Lloyd, 1976) makes this very clear.

Firstly, the sophisticated nature of the design suggests an Ionian origin --Greek doctors were already employing such controlled methods in Ionia (cf. Farrington, 1944; 1969). Secondly, goats' milk was not used for suckling infants in Egypt (indeed, its only known

application was as a remedy for anal dysfunction) but was so used in Ionia (cows' milk was not). Thirdly, there is a remark, at the end of the account, to the effect that the story was known to Greek scholars in a slightly different form. Lloyd argues convincingly that a version of this experiment had appeared earlier in Hecateus of Miletus' *Genealogies* (only fragments of this survive) and it is possible that Herodotus may have simply 'lifted' the story from there (for exhaustive discussion see Heidel, 1935).

There are still various possible alternative explanations. For example, it might have been a fictional satire aimed at foolish Egyptians or it might have actually happened in Ionia and somehow 'migrated' to Egypt. However, whatever its provenance, any claim that the experiment took place in this way or in that way is seriously weakened by this analysis of Lloyd's, since, at best, it greatly increases the remoteness of Herodotus' report from the actual event.

1.3 Plausibility

Herodotus describes an experiment of Psamtik's which might be thought of as an investigation of a genetic question, namely an attempt to fathom the depth of the springs then regarded as the source of the Nile, but since this is no better authenticated than the language experiment it does not help much. In the case of Psamtik, then, we know neither that such an experiment was consistent nor that it was inconsistent with his personal characteristics, since so little is known about him.

2. The Experiment of Frederick II (Hohenstaufen) of Sicily

2.1 Sources

Once again, we know of this experiment through only one source, the chronicle of Brother Salimbene, a Franciscan friar. The story occurs in the Chronicle as one of a long list of strange experiments recounted by the friar and runs as follows:

> 'Like Psammetichus, in Herodotus, he made linguistic experiments on the vile bodies of hapless infants, bidding foster-mothers and nurses to suckle and bathe and wash the children, but in no wise to prattle or speak with them; for he would have learnt whether they would speak the Hebrew language (which had been the first), or Greek, or Latin, or Arabic, or perchance the tongue of their parents of whom they had been born. But he laboured in vain, for the children could not live without clappings of the hands, and gestures, and gladness of countenance, and blandishments.'[3]

2.2 Authenticity

Although, unlike the previous case, Salimbene (1221-88) was a contemporary of Frederick (1194-1250), he had no connection with his court, and his personal knowledge of Frederick was limited to a glimpse of him passing through the streets of

Parma in 1235. It would be unwise, therefore, to suppose that Salimbene's sources of information were reliable. This is particularly the case since Frederick, though Holy Roman Emperor and active in Crusades, was excommunicated by Pope Gregory IX in 1227 and thereafter lived in almost continual conflict with the Church. It is therefore likely that Salimbene would have included in his Chronicle any discreditable tale that reached his ears (or his imagination).

As for the text itself, once again we have as a background assumption that some identifiable language should be the basis of the *Ursprache*. However, in this case, as well as the usual classical languages, it is thought possible that the language of the parents might be produced, in this case probably a vernacular, Sicilian. At this time the classical languages and the vernaculars were regarded as being quite different, only the former involving 'necessary' forms. There is an illuminating contemporary discussion of this point by Dante,[4] who argues that the outcome of experiments such as this would inevitably favour the classical languages.

The explanation of the outcome of Frederick's experiment is equally striking. In Western educational thought it is not until the early 18th century that such weight begins to be placed on the social and affective aspects of early childrearing. As we shall show below, Frederick was an extremely original thinker who cared nothing for received opinion and whose grasp of the elements of scientific investigation was not to be equalled for several centuries. These unusual aspects of Salimbene's report add to its credibility, since they are unlikely inventions.

2.3 Plausibility

Frederick was possibly the most unusual monarch in European history. In his time he was called *stupor mundi et immutator mirabilis*, 'wondrous transformer of the world', and with good reason. Two excellent biographies, by Kantorowicz (1928) and by Van Cleve (1972), and the specialist investigations of Haskins (1924, 1929) are the principal sources for the sketch which follows. Frederick's strongest personal intellectual interests were biological. He assembled an immense menagerie which accompanied him whenever he travelled. It included camels, lynxes, leopards, lions, panthers, apes, bears, a giraffe and an elephant; hawks, owls, eagles, buzzards, falcons, peacocks, parrots and an ostrich. In addition, his court was always accompanied by a collection of human curiosities: concubines, slave-girls, eunuchs, acrobats, conjurors, rope-dancers, etc. He maintained animal reservations in various parts of his kingdom, the most remarkable of which was a collection of waterbirds housed in 'natural' (i.e., not in a zoo) conditions in a marsh near Foggia. Like many mediaeval rulers he was passionately fond of falconry but here again his interest was scientific as well, so much so that he wrote a treatise, *De Arte Venandi cum Avibus*, which is the basis of all

subsequent writing on the subject.[5] This treatise is a large work and it contains an introduction of about 100 pages dealing with avian biology in general and describing many simple investigations of anatomy and behaviour carried out by Frederick. Aristotle is taken to task on more than one occasion for mistakes in his natural histories. Frederick is never in any doubt which should be given greater weight, the wisdom of the great philosophers and teachers or the evidence of observation and experiment. Of course, in other quarters, such as the mediaeval universities, such empirical questioning of received knowledge would have been regarded as obscene and heretical. There is little doubt that Frederick carried out other sorts of experiments as well. In the list provided by Salimbene some are undeniably dubious, but others have some substantiation - such as the 'ringing' experiment to discover the longevity of fish (cf. Hauber, 1912) - and others, like the isolation experiment, are sufficiently unusual in design or conception to make us doubt whether they are fabrications. For example, to compare the effects of activity and inactivity on digestion he had two men eat the same meal, sleep and go hunting respectively, whereupon they were simultaneously disembowelled and their stomach contents examined!

Of Frederick's other intellectual interests we should mention at this point his interests in language. He is reputed to have spoken nine languages and to have been literate in seven. He anticipated the vernacular poetry of Dante by composing many Sicilian odes and lyrics and, most remarkably, inspired the officials of his court to write vernacular poetry as well! It is clear that the imputed isolation experiments is entirely consistent with what is known about Frederick's interests and resources.

3. The Experiment of James IV of Scotland

3.1 Sources

This experiment is reported in the History of Robert Lindesay of Pitscottie as follows:

'The king gart tak ane dum woman and pat hir in Inchekeytht and gaif hir tua zoung bairnes in companie witht hir and gart furnische them of all necessar thingis pertening to their nurischment that is to say, meit, drink, fyre and candell, claithis, witht all wther kynds of necessaris quhilk (is) requyrit to man or woman desyrand the effect hierof to come to knaw quhat langage thir bairnes walk speik quhene they come to lauchful aige. Sum sayis they spak goode hebrew bot as to myself I knaw not bot be the authoris reherse. (Thir actis foirsaid was done in the zeir of god I^{m} iiij^{c} lxxxxiij zeiris.)'[6]

3.2 Authenticity

Like the previous case, Pitscottie (1500?-1565) had no personal acquaintance with

the monarch, nor personal knowledge of the experiment, since James died in 1513. 'Lauchful aige' is 'lawful age'. Exactly what is meant by this is unclear: it may have been that age at which children were thought capable of sin, that is, according to the Church, 7, or it may have been the age at which children ceased to be 'pupils' - 12 for girls, 14 for boys.[7] Pitscottie's final remark is clearly a signal to the reader that the reported outcome is to be regarded as a humorous invention, since his entire history up to that point and for a decade or so beyond is based upon 'authoris reherse' - hearsay. The experiment is, unlike the previous two, characterised as open-ended, no particular possible outcomes being specified. It is plainly a less satisfactory account evidentially, than either of the previous texts. Herodotus described Psamtik's experiment in an impressively detailed way and Salimbene's account, as we have noted, had certain features which make it an unlikely fabrication. But Pitscottie's lacks details of procedure and outcome and, indeed, has all the characteristics one would expect of a colourful fabrication - an uninhabited island as the venue (i.e. no-one could bear witness that it had not taken place) and a ludicrous outcome. It does, however, have two features that the others lack, a date and a place. The island of Inchkeith lies in the Firth of Forth, readily accessible from James' palaces in Edinburgh and Linlithgow. It was certainly visited by James during the 1490s for the purposes of falconry and he maintained a mews there (cf. Treasurer's Accounts[8]). However, there are no entries in the Accounts which relate to the experiment (such as, e.g., payments to the dumb woman). Moreover, Inchkeith was used from 1497 onwards as a repository for the victims of venereal disease, introduced to Edinburgh by the followers of Perkin Warbeck - a pretender to the English throne.[9] It is a small island and it seems likely that the experiment would have had to be concluded before this use for purposes of quarantine. Of course, it could be that the date given, 1493, refers to the conclusion of the experiment. But if this is so, then the experiment is even less credible since James was only 20 in 1493. On the whole, then, we have no very good grounds for taking Pitscottie's story as genuine. Despite this, we have made very extensive inquiries in search of additional historical evidence, but without any substantial results. There are no records surviving from either the Parish of Kinghorn (in which Inchkeith is located) or the Abbey of Inchcolm, a neighbouring island in the Firth. As footnote 9 shows, the surviving state papers are not complete, but contain no mention of the experiment. Neither do the unofficial contemporary writings of De Ayala[10] or the court poet Dunbar (Mackenzie, 1932). As well as that of Pitscottie there are three other 16th-century histories, Buchanan (ed. Ruddiman, 1715), Drummond of Hawthornden (1655), and Lesley (1830). None of them mentions the experiment. The solitary ray of hope that there may be more to the story than frivolous invention comes from Pinkerton's 18th-century history (1797, p. 25) in which there is an account of the

experiment (later embellished by Thomson,1893), which differs from that given by Pitscottie. Pinkerton was a normally reliable professional historian and we can be sure that he must have had good reason for giving a different account. But what was his reason? He cites, in addition to Pitscottie, a location in Buchanan (Chap.XIII, sect.7) but in Ruddiman's edition of Buchanan there is no mention of the experiment, at that place or at any other. Pinkerton's account runs as follows:

'To make some discovery on the origin of language, two infants under the charge of a dumb woman were sent into the isle of Inchkeith: but the self-taught speech has not been explained: and it is needless to add that it must have been original, and perhaps though there was some society, little superior to the brutish babble of those unfortunate beings, lost during infancy in extensive forests.'

So, according to this account, there was (undeciphered) spontaneous speech. Pinkerton's own observations - 'it is needless . . .' show that he was acquainted with the great debate amongst continental philosophers and educators which took place at this time and which had as one of its foci the nature of feral children (cf. Lane, 1977, for a thorough account of this). It seems to us a distinct possibility that somewhere in that massive literature there is material relating to this and other isolation experiments but so far we have been unable to find it. It may be, then, that the last word has not been said about this putative experiment of James. However, it must be conceded that, on available evidence, it seems unlikely that the experiment was performed.

3.3 Plausibility

There is a mass of evidence which shows that James was interested in experiment and in the development of the sciences, particularly medicine. Moreover, like Frederick he was a collector of curiosities. To take the last point first, he gave instructions to his merchant seamen (all of whom engaged in occasional piracy) that he would reward them for any human or animal oddity (cf. Chambers and Thomson, 1855). It is also fairly certain that he kept and maintained a joined twin. There are accounts of this in Pitscottie (Vol.I, p. 233) and in Drummond of Hawthornden (1655, p. 69). We shall give the account which appears in Aikman's translations from Buchanan's Latin (for purposes of clarity):

'About this time a strange kind of monster was born in Scotland. In the lower part of the body it resembled a male child, differing in nothing from the ordinary shape of the human body, but above the navel, the trunk, and all the other members became double, and were distinct, both in their use and appearance. They caused it to be carefully brought up, and educated, particularly in music, in which it wonderfully excelled. It also learned different languages, and in their various inclinations, the two bodies appeared to disagree between themselves, sometimes disputing, each preferring

> different objects, and sometimes consulting, as if for the common pleasure of both, and, what was remarkable, when the lower limbs, or loins were struck, both felt the blow in common, but when pricked or otherwise hurt above, only one of the bodies was sensible of pain, which distinction was most conspicuous in death; for, when the one body had died several days before the other, that which remained, when the dead half became putrescent, wasted away by degrees. I write this the more confidently, because there are many persons of undoubted veracity still alive, who saw the prodigy.'

Buchanan's dating of the monster's birth is 1490 and Pitscottie states that it lived for 28 years and, during this time was maintained by the court. (For a more recent case, see Gedda, 1951.) James' interests in medicine and science have been amply substantiated by Guthrie (1497) and Read (1938a, 1938b & 1947, Chap. 2). His new university at Aberdeen had a separate medical faculty (albeit one devoted to the customary doctrinaire and theoretical methods of teaching) and he founded the more practically-minded college of surgeons and barbers in Edinburgh, whose graduates had to satisfy their examiners that they 'knew anotamell [anatomy], nature and complexion of every member humanis bodie, and . . . the vaynis of the samyn, that he may mak flewbothomell [phlebotomy] in dew tyme . . . (for) every man aucht to knaw the nature and the substance of every thing that he werkis, or ellis he is negligent'. Moreover, each member was entitled to 'anis in yeir ane condempnit man efter he be deid to mak anatomell of, quhairthrow we may haif experience' (cited in Mackie, 1958).

James himself was an enthusiastic surgeon: the Treasurer's Accounts show payments to individuals who had their teeth extracted by him, and suchlike. In science, James founded what Read (1938b) has described as Scotland's first research laboratory in Stirling Castle around 1500. The director of this establishment was a mysterious Italian, John Damian de Falcusis (later appointed Abbot of Tongland - a sinecure) who came to Scotland around that time from Paris. Damian was an alchemist who became a close friend of James. He was provided with excellent facilities for his work, as the Treasurer's Accounts show, in addition to a position at the Court and luxurious garments of office (cf. Read, 1938b). There is no evidence either that he succeeded in multiplying his seed gold or that he was ever seriously called to account. However, another of Damian's experiments apparently was subjected to public test - human flight! The experiment is described in William Dunbar's hilarious and savage satirical poem, *The Fenyeit Frier of Tungland* (ed. by Mackenzie, 1932) and also by John Lesley, Bishop of Ross (see Lesley,1830, p. 76).

Like Frederick, we can reasonably suppose that James had an interest in language and poetry. According to the Spanish ambassador to the Scottish court, Don Pedro de Ayala, James was a wonderful linguist, speaking Latin, French, German, Flemish, Italian, Spanish

and Gaelic, but Mackie (1958, p.118) regards this as a diplomatic embellishment. It is certain, however, that James fostered vernacular poetry, which flourished as never before (nor since) during his reign. Dunbar, whom we have already mentioned, was the finest of these poets and was attached to James' court.

It should now be evident that it is wholly consistent with what is known about James that he should have carried out the isolation experiment. However, the direct evidence, as we have noted, is very weak.

4. The Experiment of Akbar the Great, Moghul Emperor of India, 1542-1605

4.1 Background

Akbar's experiment is by far the most interesting of these royal investigations. In the first place, it is the only one that is adequately vouched by contemporary documents. There are three primary sources for the experiment: Abu'l-Fazl, Badauni, and Xavier (see below) - and a large number of secondary sources some of which, though not contemporary, are still of interest. Some of these are referred to below. In the second place, Akbar's experiment was superior to the other putative experiments in conception and design. Lastly, Akbar's experiment has received hardly any attention from psychologists or linguists this century. It is described as a matter of course, along with the other experiments in some 19th-century texts, e.g., Farrar (1865), Muller (1861, pp. 480-82) and Tylor (1878, pp.79-81), but after Tylor does not appear to have been mentioned in linguistic or psychological texts until Panconcelli-Calzia (1937, 1955: reference only to Catrou, 1705 - a poor secondary source) and Borst (1957-63 IV, p. 2050: reference to the same source). Marx (1967) and Blumenthal (1970), though including surveys of early investigations, fail to mention Akbar's experiment. More recently, Hewes (1977, p. 98) and Blakemore (1976) have mentioned it, though once again without adequate detail or references. We 'discovered' it by reading Panconcelli-Calzia (*op.cit.*) as a result of reading Marx, who evidently had not read it himself.[11] Muller, as well as being a prominent linguist, specialized in Indian history and hence was thoroughly familiar with the Akbar experiment. However, he made little reference to it in his copious writings, possibly because of his rather exotic views on the subject, to wit,

> 'It is useless to inquire whether infants, left to themselves, would invent a language. It would be impossible, unnatural and illegal to try to experiment, and without repeated experiments, the assertion of those who believe and those who disbelieve the possibility of children inventing a language of their own are equally valueless!' (1861, p. 480)

Thus Muller takes the possibility of replication as an essential criterion of 'genuine' experiments and, presumably, empirical observations in general. For a student of history

this is a fairly extraordinary point of view!

We shall begin by giving some relevant details of Akbar's life and character, since we assume that neither Akbar himself, nor the mode of life of a Moghul Emperor, is familiar to most readers of these pages.

The standard biographical source for Akbar for many years has been Smith (1917), which contains a useful, but biased bibliography of contemporary material. Smith, like most biographers, concentrates on economic and political aspects of Akbar's reign and, in fact, fails to mention the experiment. Smith's biography has now been superseded by Srivastava (1962, 1967), which is much superior. Good sources for the religious and intellectual history of the period are MacLagan (1932) and Aziz (1969).

Akbar became Moghul Emperor on the death of his father in 1556. His early career showed no particular unusual features, except for a notable degree of religious tolerance (for instance he abolished a poll-tax on non-Muslims and took non-Muslim wives) which may well have been adopted as a political expedient, and a taste for exotic sports, such as pigeon-flying and polo (played in the dark with slow-burning balls of lignite) as well as the traditional royal pursuits of falconry and hunting. Hunting of large game in Moghul India was a particularly bloody business, involving the slow encroachment over several days of a 60 mile diameter circle of beaters on the hunters located at the centre. In one such *qamargha* during Akbar's reign 15,000 animals were slaughtered.

The first sign of eccentricity appears in 1575, when Akbar built the 'Ibadat-Khana (Hall of Worship) in his palace at Fatehpur Sikri, just south of Agra. This was, despite its name, a debating hall, built in the form of a cross. Akbar was illiterate and, naturally, greatly valued oral debate, although he possessed, and was said to be thoroughly acqainted with, a library of 24,000 books and manuscripts. The four wings of the cross were occupied during debates by the Ularna (Islamic jurists and professors), the Sayyids (descendents of Muhammad), the Shaikhs (wizards and prophets) and finally, dilettante members of Akbar's court. Some details of the subjects of debate are provided in The Dabistan[12] and Badauni[13]. It is 1578, however, which marks the intellectual watershed of Akbar's life. At this time he experienced a kind of vision and, as a result, adopted a thoroughly free-thinking, though still spiritualised, mode of life. He introduced various non-Muslim regimes, e.g., special fasts, into his personal habits, abandoned the murderous *qamarghas* (described above) and introduced into the debates in the 'Ibadat-Khana Christians, Hindus, Jain Buddhists, Jews, Zoroastrians and Sabeans. He established himself in partial authority over the faith by means of the so-called Infallibility Decree of 1579 and invited the first of three Jesuit missions from Goa to his court. These missions failed in their object of conversion, Akbar having deep rooted objection to (1) obedience and submission to the Church and (2) dismissal of all but one wife, the latter action being, of course, politically impossible. In fact, it is clear that Akbar's interest in Christianity was almost entirely academic. He wished

to introduce diversity into the debates in the 'Ibadat-Khana and also to obtain fresh ideas about possible faiths. In 1582 he promulgated, with the connivance of Shaikh Abu'l Fazl, his closest advisor, a new faith - the Din-i-Ilahi - which was eclectic and ecumenistic in nature, bringing together what Akbar perceived as being the most valid doctrines of the religions that he had studied. This faith did not survive him. The language experiment, which we now describe, was carried out during the period 1578-82 and thus coincides with this great intellectual and spiritual crisis in Akbar's life.

4.2 Sources

We give below, in full, the three contemporary accounts of the experiment. The first of these is from the Akbarnama of Abu'l-Fazl.[14] The Shaikh was a close personal confidant and advisor and, like Akbar himself, a partisan of free-thinking attitudes to Islam. Although Abu'l-Fazl's history is given a low valuation by Smith (1917) and also by other Europeans such as Beveridge (cf. footnote 16) and Haig (1937), this is called in question by Srivastava (1962) and by Aneer (1973). The work is often described as tedious, repetitious, full of pointless flattery and obscure allusions. That may be, but nothing factual in the Akbarnama has been faulted and the work was based closely upon state papers and other court records including *aide-memoires* recounting Akbar's every action and word. Akbar (like other Moghul emperors) kept a close eye upon posterity and employed scribes to follow him and compile these *aide-memoires* for the benefit of his historian, Abu'l-Fazl. For these reasons we feel that the greatest weight should be given to his account of the experiment, which now follows:

> 'One of the occurrences was the testing of the silent of speech. There was a great meeting, and every kind of enlightenment was discussed. In the 24th Divine year (1578) H.M. said that speech came to every tribe from hearing, and that each remembered from another from the beginning of existence. If they arranged that human speech did not reach them, they certainly would not have the power of speech. If the fountain of speech bubbled over in one of them, he would regard this as Divine speech, and accept it as such. As some who heard this appeared to deny it, he, in order to convince them, had a *serai* built in a place which civilized sounds dit not reach. The newly born were put into that place of experience, and honest and active guards were put over them. For a time tongue-tied wet-nurses were admitted there. As they had closed the door of speech, the place was commonly called the Gang Mahal (the dumb-house). On the 9th August 1582 he went out to hunt. That night he stayed in Faizabad, and next day he went with a few special attendants to the house of experiment. No cry came from that house of silence, nor was any speech hear there. In spite of their four years they had no part of the talisman of speech, and nothing came out except the noise of the dumb. What the wise Sovereign had understood several years before was

on this day impressed on the hearts of the formalists and the superficial. This became a source of instruction to crowds of men. H.M. said, 'Though my words were proved, they still are saying the same things with a tongueless tongue. The world is a miserable abode of sceptics. To shut the lips is really to indulge in garrulity. They have hamstrung the camel of the Why and Wherefore, and have closed the gate of speech with iron walls.

Verse

Enough, Nizami, be silent of discourse,
Why speak to a world with cotton in its ears,
Shut your demonstrations into a narrow phial,
Put them all in a phial and place a stone thereon.'

We may note, for further reference, two points of ambiguity. First, it is not clear whether the speech, whatsoever it might be, is to be regarded as Divine or whether the type of speech that it is (e.g., Persian, Hebrew, etc.) is to be counted as Divine. That is we do not know whether Akbar entertained two hypotheses (no speech, some particular known speech) or three (no speech, some unknown speech, some particular known speech). Second, something 'came out', *viz*. 'the noise of the dumb'. It is unclear to us exactly what is meant by this. Beveridge makes no additional comment here. Although a scholar of 16th century Persian might be able to make this more precise, it seems likely that the outcome will remain essentially ambiguous: were they simply 'noises' or perhaps a kind of language, however primitive?

The second contemporary account is by Badauni. Badauni was an orthodox Sunni Muslim and detested Akbar's religious vagaries. His history contains much derogation of these tendencies and, accordingly, was not published until after Akbar's death. Srivastava (1962) regards it as bigoted and less reliable than the Akbarnama and observes that the translation of the relevant volume by Lowe is inaccurate.

'At this time they brought a man to Court, who had no ears nor any trace of the orifices of the ear. In spite of this he heard everything that was said to him, though the place of the ears was quite level. And in this year, in order to verify the circumstances of this case, an order was issued that several suckling infants should be kept in a secluded place far from habitations, where they should not hear a word spoken. Well-disciplined nurses were to be placed over them, who were to refrain from giving them any instructions in speaking, so as to test the accuracy of the tradition which says: 'Every one that is born is born with a natural tendency', by ascertaining what religion and sect these infants would incline to and above all what creed they would repeat. To carry out this order about twenty sucklings were taken from their mothers, for a

consideration in money, and were placed in an empty house, which got the name of 'Dumb-house'. After three or four years they all turned out dumb and the appellation of the place turned out prophetic. Many of these sucklings became the nurselings of mother earth:

> My mother is earth, and I am a suckling,
> The propensity of children for their mother is strange,
> Soon will it be that resting from trouble
> I shall fall drunk with sleep on my mother's bosom.'

We may note that the connection between the earless man and the experiment is, to say the least, obscure! The 'natural tendency' referred to is, of course, to Islam. The final metaphor is clearly for death.

The third and last truly contemporary account is by Hieronymus Xavier, who had charge of the third Jesuit mission to Akbar in 1598. The account appears in a letter of Xavier's, which was published in a number of different locations[15] . We give the translation by Beveridge (1888). A convenient source for this translation is MacLagan (1932). Xavier is reporting a conversation with Akbar himself:

'He told me that nearly 20 years ago he had 30 children shut up before they could speak, and put guards over them so that the nurses might not teach them their language. His object was to see what language they would talk when they grew older. He was resolved to follow the laws and customs of the country whose language was that spoken by the children. But his endeavours were a failure, for none of the children came to speak distinctly. Wherefore at this time he allowed no law but his own.'

Although there are some discrepancies with the account in the Akbarnama, the details are very similar and there is a perfect correspondence of dates. Xavier, like Badauni, attributes a purely religious motive to Akbar. Abu'1-Fazl is, as we have seen, much less clear about this. After all, according to Abu'1-Fazl, Akbar's own belief (in advance of the experiment) was that there would be no power of speech. It is interesting that the motive, even if religious, is still different from the motives of Psammetichus and James IV, which were ethnological.

Turning now to secondary sources, we have managed to discover five that are not far removed in time from the date of the experiment. These are Purchas (1626, p. 516), Sennert (1643), the Dabistan (footnote l3), Manucci (1653ff.) and Catrou (1705). Purchas' and Sennert's accounts are clearly based on Xavier's and add nothing to it. The others differ, in different ways, from the primary accounts and are given in full.

From the Dabistan (ca. 1648):

‘In like manner, a number of children were put in a place called Gangmahel, where everything necessary was furnished to them; but none could articulate a letter; having remained there to their fourteenth year, they were found to be dumb, which made it evident, that letters and language are not natural to man, that is, cannot be used unless they have been acquired by instruction, and it is then only that the use of conversation becomes possible. From this the conclusion was drawn that the world is very ancient and language of long date.’

From Manucci (1653ff.):

'Akbar had been anxious for a long time to satisfy two subjects of curiosity, which he kept in his heart. The frst was to know what language a child would speak who had not the use of speech or any master to teach it. The second was to find the source of the famous river Ganges. For the first of these inquiries he ordered the erection of a house with many rooms at a distance of six leagues from the city of Agrah, and directed them to place in it twelve children, who should be retained there till the age of twelve years. An injunction was laid on everyone that, under pain of death, no one should speak a word to them or allow them to communicate with each other. This was done, because one set of men asserted that they would speak the natural language, that which was the language of our first parents. Others held that they would speak the Hebrew language; others that they would not speak anything but Chaldean; while the Hindu philosophas and mathamaticians asserted that they must infallibly speak the Samscript (Sanskrit) language, which is their Latin. However, the twelve years having passed, they produced the twelve children before the king. Interpreters for the various languages were called in to help. Each one put questions to the children, and they answered just nothing at all. On the contrary, they were timid, frightened, and fearful, and such they continued to be for the rest of their lives.'

From Catrou (1705):

'It may be said, that curiosity and a thirst for knowledge were the ruling passions of Akebar. His indulgence of these propensities prompted him to a very singular experiment. He was desirous to ascertain the language in which children would express themselves, who had been kept in ignorance of the articulate sounds of any known language. The emperor had been informed, that the Hebrew was the original language of the human race, and the one, which all, who had not been taught any other, would naturally speak. In order to secure a conviction on this point, he ordered twelve children to be taken from the breast, and to be closely confined in a castle, which was situated six leagues from Agra. They had given to them, for nurses, twelve women, who were dumb, with the addition of a man, who was also dumb, to save as porter. The porter was forbidden, on pain of death, ever to open the gates of the castle. When the children had attained the age of twelve years, Akebar commanded that they should be brought into his presence. He then assembled in his palace persons skilled in various languages. A Jew, who was at Agra, was appointed to the office of deciding, whether the language to which they might give utterance, was Hebrew. The capital furnished Arabians and Chaldeans in abundance. The Indian philosophers, on their side, contended, that the children would speak the Sanscrit, which is the dialect of the learned of the country, and holds among them the same place, as does the Latin among

> the learned in Europe. The ancient books of philosophy and the Indian theology are written in this language. When these children appeared before the emperor, to the surprise of every one, they were found incapable of expressing themselves in any language, or even of uttering any articulate sounds. They had learnt, from the example of their nurses, to substitute signs for articulate sounds. They used only certain gestures to express their thoughts, and these were all the means which they possessed of conveying their ideas, or a sense of their wants. They were, indeed, so extremely shy, and, at the same time, of an aspect and manners so uncouth and uncultivated, that it required great labour and perseverance to bring them under any discipline, and to enable them to acquire the proper use of their tongues, of which they had previously almost entirely denied themselves the exercise.'

These secondary accounts are of dubious value. To varying extents they differ from the contemporary accounts and, naturally, from each other. This is true even of Catrou and Manucci, and in that case we know that the former is directly based upon the latter. In the case of discrepancy we must (other things being equal) prefer the contemporary accounts. So we may reasonably discount the claim in Manucci that the children were not allowed to communicate with one another, which makes a nonsense of the whole experiment. Why undertake the cost and trouble of isolating a large group if isolating one child would be sufficient? The *Dabistan* is interesting on account of its remarkably perceptive conclusion. Catrou's is undoubtedly the most provocative account, since it comes closest to what we would suppose to be the most likely outcome of such an experiment (cf. discussion below). However, without arduous and costly bibliographic research (which would very likely be fruitless) it is impossible to evaluate Catrou's claims about the outcome of the experiment. As is commonplace in historical research, the state papers and other fundamental documents available to Catrou are now lost (Srivastava, 1962).

At present, then, we are justified (or so it seems to us) in assuming that Akbar's experiment tells us only that a system of communication based upon speech cannot be created in a single generation. This is the strongest claim compatible with Akbar's data. It is possible that, had the period of isolation been longer, such a system would have been developed. Equally, it is possible that there was a rudimentary system of this sort but that its presence went unnoticed. The difficulty of distinguishing language from gibberish (cf. glossolalia) is well-known.

4.3 Plausibility

We would like to begin by drawing attention to the scientific isolation of this experiment of Akbar's. As far as we know there is no general treatment of the development of scientific thought in India (as there is, for example, in the case of China, cf. Needham, 1954-).

Islamic influence on the development of astronomy, chemistry and medicine in the West has been considerable, and Frederick II's anachronistic empiricism can perhaps be traced to the Islamic faction within his court. Yet, a recent survey of the intellectual influence of Islam in India (Aziz, 1969) fails to mention any scientific involvement.

Although in the case of Akbar it is superfluous to investigate the plausibility of his experiment, since the direct evidence is so strong, it is worth doing so since it shows that plausibility (obviously not a sufficient condition for attributing such an experiment) is not a necessary condition either. There is no convincing evidence that empirical procedures were common at the time of Akbar in India. So Akbar's experiment must be regarded as inconsistent with what other information we have about his background and scientific interests. Indeed, the only grounds on which we might claim that the experiment was a plausible one are that Akbar, as shown by his activities in the 'Ibadat Khana, had a strong interest in fundamental religious questions, many of which are genetic in nature. But the tremendous costs of his fantastic many-sided debating forum surely suggest that Akbar regarded scholarly argument, rather than experiment, as the proper way of resolving such questions! Accordingly, we ought to conclude that it was not in character for Akbar to carry out this experiment. And yet he surely did, so it may be that, although it seems to be an entirely natural procedure, our practice of assessing plausibility may be quite valueless as far as the question of authenticity is concerned.

5. General Discussion

Plainly there is little to be gleaned from these experiments which bears on the genetic question. The only experiment with a relevant outcome is Akbar's and there, as we have already remarked, the outcome is ambiguous. The 'noise of the dumb' reported by Abu'l Fazl and corroborated by Xavier could have been practically anything from silence to fully-fledged language. Moreover, in the absence of speech we would expect there to have been some gestural communication (see below for substantiation) and yet this was not reported in the contemporary accounts.

The second issue to be dealt with here is more troublesome: can we, accepting the impossibility of contemporary 'royal investigations', do anything to answer the genetic question today? Our discussion of this issue will be brief and rather dense

First of all, it seems to us that the classical question, 'What language will be spoken by children isolated from birth?' could and should be made more precise. A number of relatively free parameters can be recognised, as follows:

(1) the presence of one or more caretakers;

(2) the number of children isolated;

(3) the ages of the children at the start of the experiment;

(4) the period of isolation;

(5) the set of communicative resources available to each ordered pair of individuals (channel) in the group. By this is meant the repertoires of detectable (i.e., visible, audible, tactile) gestures able to serve as signs;
(6) the system for communication that is (by virtue of experience and/or heredity) natural to each individual;
(7) the system for communication which has been established (by intra-group contact) for each ordered pair of individuals (channel) in the group;
(8) the communicative load during the period of isolation--that is, the interests, wishes, intentions, needs, etc., of the ordered pairs of members of the group insofar as they (a) are novel and (b) relate to joint action and interaction, and
(9) the physical circumstances of isolation.

For any particular experiment, some of these parameters will be constant ((1), (2), (3), (4), the natural system of the caretakers, and (9)) during the period of isolation. The remainder will vary with ongoing sensory and motor development (5), affective and cognitive development (8) or with all parameters (the natural systems of the children, and (7)). When different possible experiments are considered, however, all of the constant parameters must be regarded as variables. In addition, some of the variable parameters may be varied between experiments: most obviously, selection of deaf and/or dumb caretakers and/or children will interfere radically with parameter (5). Although parameter (6) has a clear interpretation for caretakers and will in general be a natural language, it is less clear for the case of the children. What we intend here is the minimal system of meaningful audible and visible gesture which is given by inheritance together with (for points later in the course of an experiment or for later starting points) the modification and augmentation of this system which results from development of the systems of variable (7). Roughly, for each child, the system mentioned in (6) will be revised so as to correspond with the union of the systems of variable (7) for each channel involving that child. Now, since the values of all parameters other than (7) are either (a) available for direct manipulation or (b) dependent on relatively autonomous psychological development, we may think of the array of values mentioned in (7) as the output of a very general time-function of the other eight parameters.

The classical question may then be seen as a question about the value of this function (let us call it the language acquisition function, LAF) for a limiting[16] set of values of its arguments, namely where no resources are available on any caretaker-originating channel and where no system of communication has been established on any child-originating channel. In fact, it is evident that this is not only a limiting case of the general function but also an unattainably ideal one. In practice, no caretaker could be 'pruned' of communicative resources and still be able to take care. Equally, children who were isolated without a

caretaker before their communicative resources had developed to the point where systems of communication could be established would simply not survive. It is therefore quite plain that the classical question (construed as this ideal case) cannot be answered directly, i.e., empirically. However, if we could discover the nature of the general function LAF (by determining its value for other empirically and ethically feasible values of its arguments) then we could give a theoretical answer to the classical question. In fact, we know a little about LAF already. For example, Feldman *et al*. (1977) have shown that in the case of only children who are profoundly deaf and who are raised by parents who deliberately inhibit conventional visible gesture, the output of LAF after 3 years or so is a system of visible gesture substantially more complex than the residue of natural gesture (pointing, etc.) employed by these caretakers. Further, it has often been noted (cf., e.g., Stokoe, 1974; Tervoort, 1961) that groups of young deaf children will develop (with minimal assistance or, indeed, despite active opposition) quite complicated gestural systems well-adapted to their communicative load. So it seems as if LAF has some limited powers of augmentation, a position which is also implicit in the hypothesis that the 'creole continuum' cf. Bickerton, 1974) is the synchronic consequence of rapid development of an original pidgin by successive generations (Hall, 1966).

Another kind of 'natural' experiment which bears on LAF is the case of twins. It is well known that a high proportion of twins (identical or otherwise - develop 'secret languages' for communication within the twin (cf. Zazzo, 1960 II, chap.4). Although these are often marginal and simple this is not always the case. In addition to the more or less inscrutable cases cited by Hale (1888) and Jesperson (1922) there is the spectacular modern case of Poto and Cabengo (Orange, 1977)[17] . Whether such cases provide evidence for the position that LAF is an augmentative function is unclear but it seems certain at least that quite radical alterations are possible. Finally, there is a natural source of evidence which has only recently begun to be tapped, viz., cases where children with normal hearing are reared by deaf parents. Potentially, such cases are promising since they come so close to the conditions of the classical isolation experiment. However, modern urban cases are complicated by the factors of television and hearing relatives, both readily available speaking caretakers. Some systematic work has recently been reported by Schiff and Ventry (1976) and Schiff (1979). The latter paper gives a comprehensive bibliography of previous, unsystematic case reports. While such children typically show eventual deficits which may persist through middle childhood (Schiff and Ventry, 1976), they swiftly surpass the oral language of their principal caretakers and, at any rate in the first year and a half of language acquisition, their oral language develops in much the same fashion as normal-caretaker controls. In Schiff's words (1979, p. 581) "children, when cognitively ready, need little exposure to the normal model language to learn to speak during the early stages of development". Certainly, there is nothing in this research which speaks against the notion

that LAF is augmentative and much that speaks for it.

However much information such natural experiments may yield, it remains unlikely that it will be sufficient to determine the function LAF. Moreover, the timespan of such investigations is perforce long and their moral character (given the alternative of intervention) dubious at best. A more practical, if less gaudy, method for obtaining further information about LAF would involve parents' voluntarily adhering to speciific communicative regimes for short periods during development whilst closely monitoring the systems for communication employed by the children during this period. Natural experiments which approach this characterisation have now been quite widely investigated (cf. the studies collected in Snow and Ferguson, 1977). All that would additionally be involved is the element of control over caretaker-originating channels and control or measurement of the communicative load.

As a final point, we would like to mention the old argument due to Hale (1886, 1888) that the geographical distribution of unrelated language isolates is correlated with the probability of abandoned groups of children managing to survive. Thus, in hostile environments, such as the Arctic regions or the great deserts, no unrelated languages are to be found, while in regions where the climate is favourable and food is plentiful (Hale's favourite example was California) many unrelated languages are found. Hale used this presumed correlation as evidence supporting his view that abandoned groups of children would routinely re-invent language. This now seems rather hopeless, since the number of apparently unrelatable languages has shrunk so dramatically since Hale's time. The question which now arises is whether the lack of language isolates in favourable areas constitutes evidence against Hale's view that rapid language invention is a routine consequence of isolation? That is, granting the possibility of rapid language re-invention under conditions of isolation, should there not be many more unrelated languages than there appear to be? We think not: the processes of pidginisation and creolisation show how massive and rapid the effects of contact can be. It seems more reasonable to suppose that unrelated language isolates are a consequence of geographical, political or economic isolation, rather than of natural isolation experiments![18]

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Footnotes

[1] We are indebted to Professor G. Barrow of St. Andrews University for making this point clear to us.

[2] Herodotus' well known *Histories* are of course available in a number of editions with a range of alternative translations and commentaries. The text presented below is from the English translation by Powell (1949:109-10) of Book II, section 2.

[3] The text given is from Coulton's (1907) translation of part of the Chronicle. An edition of the original chronicle, *Cronica Fratis Salimbene de Adam Ordinus Minorum*, appears in *Monumenta Germaniae Historiae*, XXXII, Scriptores, ed. by O. Holger-Egger, p. 350.

[4] In *De Vulgare Eloquentia*, translated into English, with notes, by A.C. Ferrers Howell. (London: Kegan Paul, Trench, Trubner & Co. London, 1890).

[5] Bibliographical details and a review from the standpoint of the history of science can be found in Haskins (1921). A modern edition in English with copious illustration and accompanying background material is available (Wood and Fyfe, 1948).

[6] Robert Lindesay of Pitscottie's *Historie and Cronicles of Scotland* exists in several manuscripts. The (1899-1931) edition by A.J.G. Mackay (Edinburgh: Wm. Blackwood for the Scottish Text Society) is based on two of the oldest MSS. It is well-known as a colourful and unreliable history (cf. the remarks in Nicholson 1974:328, 627). The text reproduced below is from volume 1, p. 237 of Mackay's edition.

[7] This latter suggestion was offered by Professor G. Donaldson of Edinburgh University.

[8] (Treasurer's Accounts) *Compota Thesaurariorum Regum Scotorum: Accounts of the Lord High Treasurer of Scotland*, ed. by T. Dickson and Sir J. Balfour Paul (1877-1916). These accounts, though incomplete for certain years (e.g., 1499), together with the *Exchequer Rolls of Scotland*, ed. by J. Stuart and others (1878-1908) provide a fair record of the official expenditure of the Crown. As such they are perhaps the most important primary documents for the royal history of the period. Indeed, there are few other reliable records from the mediaeval period in Scotland that survive.

[9] Mentioned in Edinburgh Burgh records (cf. Marwick 1869-82, 1871). Inchkeith was used in 1475 for a similar purpose - quarantine of plague victims (cf. *Exchequer Rolls*, VIII, 364). Apart from these incidents, Inchkeith's principal function was as an important naval station.

[10] Ambassador to Scotland from the Court of Spain. His letters are collected in volume 1 of Bergenroth (1862-68), and a translation of the material relating to James IV can be found in P. Hume Brown ,1891.

[11] One may reasonably speculate that other investigations may come to light. For example, there is a tantalizing reference by M. Robert Réboul in Hervé (1909) to an attempt to carry out an isolation experiment by Louis-François Jauffret in the early l9th century. Jauffret was the founder of the famous *Société des Observateurs de l'Homme*. Hewes (1978) contains further details of this possible 'lost' experiment. Although we have

described this method of investigation as 'barbarous', this last example shows that the method's appeal is not limited to the mediaeval mind. Indeed, at the time of writing this note we have received news of an attempt by a Californian group to obtain funds (and presumably permission) for such an experiment in the remote southern seas . .

[12] The *Dabistan* is a Persian manuscript thought to have been written by one Muhsin Fani around 1648. It deals with various religions and, in particular, with the origins of Akbar's own faith, the Din-i-Ilahi The text given below is extracted from section Vlll of David Shea's English translation (Paris, 1843).

[13] Mulla Abdul Qadir Badauni published a three-volume history in Persian (the second volume being devoted to the reign of Akbar) shortly after Akbar's death, the *Muntakhab-ut-Tawarikh*. The whole work has now been translated into English and published in the Bibiliotheca Indica series by the Asiatic Society of Bengal. The text given below is from the translation of volume II by W. H. Lowe (1884), p. 296

[14] The *Akbarnama*, once again a Persian manuscript, was translated into English by H. Beveridge and published in 3 volumes by the Asiatic Society of Bengal in their Bibiotheca Indica series (1897-1910). The text which follows appears on pp. 581-2, sect. 393, volume III of that edition.

[15] Xavier's letter (in Latin) originally appeared in a pamphlet by John Oranus of Liege (1601), *Japonica, Sinensia, Mogorana, hoc est, de rebus apud eas gentes a Patribus Societas Jesu anno 1598 et 99 gestis*. The original Latin and an English translation appear in Beveridge (1888).

[16] We shall not discuss the most extreme limiting case, where a single infant is isolated. As is well-known, there have been a number of celebrated 'natural' experiments of this sort (cf. for reviews, Panconcelli-Calzia 1935 & 1937; Zingg 1940, and Brown 1958 (Chap.V); for the most interesting such cases, see Lane 1977, Curtiss 1977, and the strange and possibly fanciful Armen 1971). It is sufficient to note that in no such case has the isolate shown signs of being able to communicate in a systematic way and to record our own view that it is inconceivable that any should, except for the sort of communication system that might be established with an animal caretaker. From the point of view of this paper, a more interesting 'natural' experiment would be one in which two or more infants were accidentally isolated. However, apart from the dubious case of the wolf-children of Midnapore (Singh and Zingg 1942; Ogburn and Bose 1959; MacLean 1977), who showed no reported signs of ability to communicate, there are no usable reports of such cases.

[17] According to Edward Klima (personal communication), the 'secret language' of Poto and Cabengo appears to be a version of English.

[18] An additional ground for not discarding Hale's hypothesis is that it is highly likely that such natural isolation experiments have occurred and will continue to occur in politically turbulent areas such as Central Africa and SouthEast Asia. The displacement of the Californian Indian peoples resulted in one known case (the Lone woman of San Nicolas Island, see Heizer and Elsasser 1963) which might well have been a case of the type Hale envisaged (but was not). Also, Moffat (1842, p. 10-11) in a discussion of the varieties of dialect found among the Balala and Sechuana Bushmen of Southern Africa observes that '[on hunting and scavenging expeditions] fathers and mothers and all who can bear a burden, often set out for weeks at a time, and leave their children to the care of two or more infirm old people. The infant progeny, some of whom are beginning to lisp, while others can just master a whole sentence, become habituated to a language of their own .... In the course of a generation the entire character of the language is changed.'