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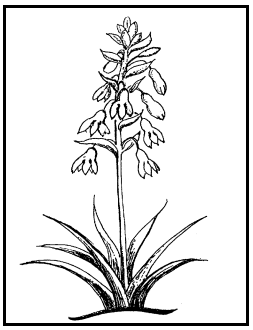

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The Galton Institute

NEWSLETTER

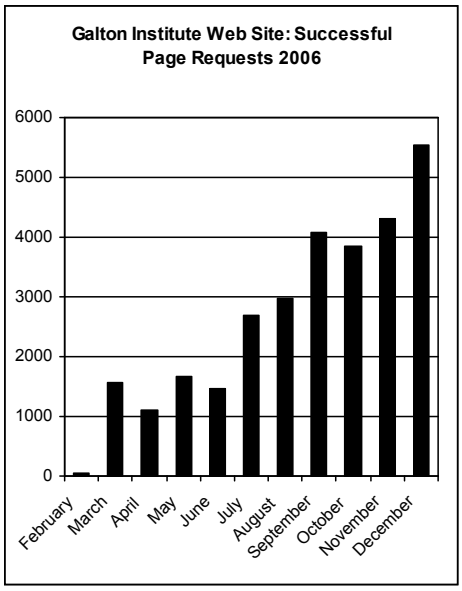
Issue Number 61 December 2006

Contents

The Galton Institute Website

As can be seen from the graph below, the popularity of the Institute's website is steadily growing. However, we are getting very little feedback from members about what they like and dislike about the design and content of the site. We really are genuinely keen to receive feedback, both good and bad, to help us improve the site and offer content that members find interesting and useful. Of course we also hope that the site will act as a showcase of Institute activities and interests, encouraging more people to join. It should also help to dispel ignorance about what the Institute is and does.

So, please have a look at the site and tell us what you think. You can email or write to Betty Nixon (betty.nixon.t21@btinternet.com).



Grants for Conferences and Workshops

As announced in the June 2006 issue of the Newsletter, the Institute now offers grants of up to £1000 towards the cost of conferences and workshops on topics relevant to the Institute's objectives.

We are keen to publicise this initiative and have had some posters printed – there is one with this issue of the Newsletter. Council will be most grateful if you can find somewhere appropriate to display this poster. If you can usefully place more posters, please ask Betty Nixon to send you some.

Fisher's *Statistical Methods* and the Eugenics Society

A. W. F. Edwards

One of the most influential scientific books of the twentieth century was R. A. Fisher's *Statistical Methods for Research Workers,* first published in 1925 and running to thirteen editions in his lifetime. It was one of a series 'Biological Monographs and Manuals' published by the Edinburgh firm of Oliver & Boyd under the editorship of F. A. E. Crew of Edinburgh and D. Ward Cutler of Rothamsted Experimental Station, where Fisher had been appointed statistician in 1919.

This might seem unremarkable were it not for the fact that all three men were leading participants in the affairs of the Eugenics Society. In October 1924 Fisher was one of the Honorary Secretaries and both Crew and Cutler were members of the Council. Crew became Professor of Animal Genetics in the University of Edinburgh and lived until 1973, whilst Ward Cutler died young in 1941 when still head of the Microbiology Department at Rothamsted.

The story of the birth of the book can

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be pieced together from correspondence published by J. H. Bennett in *Statistical Inference and Analysis: Selected Correspondence of R. A. Fisher* (Oxford: Clarendon Press, 1990). Robert Grant was one of the partners in Oliver and Boyd and corresponded with Fisher in 1950 about the proposal by the editor of the *Journal of the American Statistical Association* to mark the silver jubilee of *Statistical Methods* with 'one or two articles on the character and consequences of that volume'. He reminisced 'It all takes my mind back to that day when Frank Crew called relative to your manuscript, how he spoke of its quality, the formative work that it contained, and urged publication if only on the grounds that statistics in future would and must form part of research work in every science'. Fisher replied 'It was Cutler who approached me, probably after consulting Crew, and certainly he came at the right moment, for I did not have to do any mathematical research *ad hoc,* but only had to select and work out in expository detail the examples of the different methods proposed'.

Note. The author's full-scale account of Fisher's book was published in 2005 in *Landmark Writings in Western Mathematics: Case Studies, 1640—1940,* edited by I. Grattan-Guinness and published by Elsevier.

Book Reviews

Latham, Antony. ***The Naked Emperor: Darwinism Exposed.*** Janus Publishing Company. 2005. Paperback, pp 257. £9.95.

At once I should declare an interest (as those in Parliament sometimes say, and ought perhaps to say more often). Or rather I should declare a disinterest (as those political individuals never seem to say). It may be sad, but I do find it impossible to cope when some belief is put forward that I find totally incomprehensible, such as the existence of a God. Reality is hard enough to accept, as I see it, without invoking the existence of a deity who was, or is, in charge. On the third page of this book's preface its author states that, in 1982 when working in a Kenyan hospital, he 'became a Christian'. From then on, however much I listen to his arguments, I am swimming uphill.

Be all that as it may, I do acknowledge that he has done a great deal of homework on Darwinism, on evolution and all that. He is also entirely right in saying that much, if not most, of biology has never been explained, such as life's alleged origin within primaeval ooze or outer space, such as the arrival of RNA and the business of replication, or - no less disturbingly - the great leaps forward from one kind of creature to quite another kind. Dr Latham is happy to accept that what he calls micro-evolution occurs along the lines suggested by evolutionists but cannot accept that macro-evolution happens in similar style. He therefore implies, suggests, or determinedly insists that a god must be involved.

I have met clever people who cunningly argue that black is white. They lead me through a bewilderment of causes and effects, all entirely logical, before triumphantly proclaiming that black must indeed be white. I am then left, like a fish on the bank, gapingly wondering which sequence was faulty in moving the argument from A to B, or Z. So why, if I find the existence of a creator just one step harder than the non-existence of any such entity, am I bothering to review this book? The answer is that it is well done. The research, as I say, is good. The quotes are widespread, and the writing acceptable. Therefore, for those who wish to discover why believers prefer to believe rather than throw up their hands with disbelief, this is the book for them. All manner of relevant arguments are packed within it. Very soon black does equal white, and Darwin is without clothing, as many have suspected all along.

Anthony Smith

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Eldridge, Niles. ***Darwin: Discovering the Tree of Life.*** W.W. Norton & Company. London and New York. 2006. Pp. 256. £23.

Do we need yet another book about how Darwin arrived at his theory of evolution by natural selection? What insight has Eldredge to offer that other commentators have not covered? Eldredge will be familiar to many readers as one half of the Eldredge and Gould who for many years championed the concept of saltation in evolution. So it comes as little surprise that this book's special slant on Darwin's work is to argue that his one great mistake was the conclusion that natural selection must result in gradual transition from one species to another.

Origin of Species was the result of twenty years of meticulous work during which Darwin developed, refined and polished his theory. In consequence, *Origin* reveals little about the thought processes by which Darwin actually arrived at the key concept of natural selection. Eldredge has studied the notebooks in which Darwin recorded his emerging thoughts as his ideas developed, in order to expose those thought processes. Eldredge concludes that Darwin was the first modern scientist, in the sense that he arrived at a hypothesis by induction and then ruthlessly identified the consequences of that hypothesis being true so that they could be tested against observation. In most cases these consequences were confirmed – indeed, Darwin had refined his theory to ensure that its predictions were consistent with the evidence. Examples include the branching classification of organisms based on similarity of key features, vestigial organs, adaptation of an organ originally evolved for one purpose to serve a new purpose and, most importantly, the geographical and geological succession of similar (and hence related) species.

But Darwin was unable to confirm one particular prediction, that the geological record should show the gradual transition from one species to another. Where were the intermediate forms that Darwin predicted from his theory? What the geological record actually showed was that particular species remained constant for long periods of time and then their sudden replacement by a descendent species. Darwin's only explanation for this was the incompleteness of the geological record which he likened to a book with most of the pages torn out. He was absolutely convinced that if a complete geological record were to show no intermediate forms then his theory would be proved false.

Over the last 150 years our knowledge of the geological record has become much more complete. Some intermediate forms have been found, but in the main they have remained remarkably elusive. This fact has been seized upon by creationists of various flavours to argue that evolution has not taken place and that every species was specially created by an intelligent designer. To Eldredge the resolution of this problem is simple – evolution is not gradual and Darwin was wrong to see gradualism as a necessary consequence of the process of natural selection. In a constant environment species remain stable, changing little over vast periods of time. But when the environment changes and a global or local catastrophe wipes out many species, the remaining species

evolve rapidly to adapt to the new conditions and to fill now vacant ecological niches. And, argues Eldredge, minor catastrophes are a pretty regular occurrence in Earth's history.

All this is very fine, very reasonable and not particularly startling. What is not at all fine is the way that Eldredge implies that this insight in some way contradicts the insights of other commentators on evolution, especially Richard Dawkins. This is not so much a feature of the current book, but has been very much a feature of past polemic. But even on this book a quotation on the dust jacket, referring to Eldredge's previous book *Why We Do It*, asserts that "Finally we have a public voice who can give Dawkins and his 'selfish gene' cronies a run for their money". There is really no contradiction between the insights of the selfish gene concept and the idea that evolutionary change does not proceed at a uniform rate. To suggest there is only plays into the hands of the creationists who will exploit and rejoice at any apparent disagreement between the advocates of Darwinism.

You don't need a 250-page book to make the argument summarised above. So, in the tradition of science documentaries on television, there is plenty of padding. Much of it is awfully familiar but there are some very nice illustrations, although one – that purporting to be Darwin's mother – is incorrectly identified and others – including that of Francis Galton – have been ineptly scanned from other publications

Robert Peel

*****

Outspoken Women: An Anthology of Women's Writing on Sex, 1870-1969 edited by Lesley A. Hall. London and New York: Routledge, 2005, £19.99. ISBN 0-415-25372-1. Pp. viii + 344.

Lesley Hall is principally an archivist at the Wellcome Library for the History and Understanding of Medicine, London, so she is fortunate to be surrounded by an unusually rich archival collection, in which she has developed extensive expertise in recent years, and where much of the research for this volume was done. *Outspoken Women* brings together the non-fictional writings of British women on sexual attitudes and behaviour from the supposedly prudish Victorian era to 'second-wave' feminism and the sexual revolution of the 1960s. Hall has compiled a wide selection of excerpts, from polemic literature and *belles letters* to medical manuals, social surveys and works of advice. In order to keep the volume of material manageable, fiction, autobiography and memoirs were excluded from her remit. The authors, both famous and much lesser-known figures, nonetheless provide a diverse range of perspectives, and include among them social Darwinists, sexologists and psychoanalysts, as well as women writing more generally about their own lives and experiences. Since the bulk of the anthology is excerpts from primary material, it above all provides students and scholars with an invaluable source of carefully selected, thematically- and chronologically-arranged primary material.

The study reveals a much neglected tradition of British women's writing on sex, and provides, in the brief sections where Hall analyses the subject matter, a most engaging examination of this fascinating subject. Despite the fact that much good work has been conducted on the history of sexuality in recent years, by scholars from a wide variety of disciplines, most has focused on significant men within this history and upon the role of sexology in relation to masculine or homosexual identity. It is thus high time that the relative significance and content of female contributions was made clear, and this anthology is a substantial beginning.

As Hall demonstrates, much of the work of this era was from an implicitly, if not explicitly, feminist perspective, critiquing existing social arrangements and male-defined mores, suggesting changes, and formulating concepts of female sexuality. While such work reveals the 'dark side' of sex for women, which we already have some knowledge of – prostitution, venereal disease, sexual ignorance and marital misery – more significantly it also promotes the possibility of a brighter view – pleasure, informed understanding of sexual life, and even experimentation and rewarding friendships between women. The book also reveals that issues which the activists of the 'second wave' of feminism during the 1960s and beyond claimed they were originating were in many cases questioned many decades previously. Women of previous generations clearly did not, as Constance Rover claimed in 1970, merely 'subscribe to conventional mortality'. There was, in fact, by the 1960s a substantial and important tradition of women writing about female sexuality.

Hall's introduction gives an overview of the topic, which sets the context for individual women to then slot into. My only criticism is that I wanted more! However, the focus of the book is the many excerpts which Hall has collected from a myriad of sources. So we are presented with five substantial chapters on 'The Victorians 1870-1901', 'The Suffrage Era 1902-18', 'The Stopes Era 1918-29', 'The Depression and War 1930-45', and 'Sex in the Welfare State 1945-69'. Many topics are addressed, including marriage, female desire and pleasure, heterosexual relationships outside of marriage, lesbianism, prostitution, sexually transmitted diseases, birth control and abortion, sexual ignorance and the need for sexual enlightenment. Each chapter follows roughly the same themes so it is also excellent for gaining a sense of continuity or discontinuity over time.

I can merely sketch some of the trends which Hall unearths from the illuminating excerpts which follow. She describes how the major theme of the Victorian period is the attack on the 'double standard' of sexual morality, and that the campaign against the Contagious Diseases Acts of the 1860s evolved into a much wider 'social purity' movement aimed at the moral regeneration of society. While historians have demonstrated that this was a complex phenomenon which cannot be mapped into conventional political divisions or analysed in simplistic terms of 'repression', 'liberation' or 'protection', there was a continuing thread within it strongly opposed to the sexual exploitation of women, and the way in which women were placed at a disadvantage by existing social conventions which equated 'innocence' with 'ignorance'.

The suffrage movement has sometimes occluded the diverse range of causes for which women were campaigning at the beginning of the twentieth century, and for which, in fact, many saw the vote as necessary but not sufficient in itself to achieve reform. Prevailing concerns about venereal disease and eugenic anxieties were deployed by women to articulate feminist agendas around marriage, motherhood and morality. Prostitution remained a burning issue. There is also a gradually developing recognition of the female potential for sexual desire and pleasure, and the concept that sexual activity may have physical and emotional benefits besides its reproductive aspect.

The inter-war period has often been characterized as one in which the vigour of feminism rapidly declined once suffrage was achieved. The material quoted here, however, contradicts this simplistic analysis of an era in which feminist fervour was taking many different directions. The situation of the unmarried woman becomes particularly acute in the aftermath of the Great War and the slaughter of many actual or potential husbands. With Marie Stopes in the articulate

forefront of the campaign, this is also the period when birth control comes out of the shadows and is widely debated and advocated. During the 1930s, the texts represented here suggest that economic depression, the rise of fascism with its strong anti-feminist message, the debates on population decline and their associated pro-natalist rhetoric, provided a background against which a feminist discourse on sexual issues seemed far from obsolete. The material from this period shows a growing assumption that birth control was a won cause (although practicalities of provision and method remained) and a major factor in liberating women from their biology. Some radical figures in the movement move on to the next battle, joining Stella Browne in pleading for the legalization of safe surgical abortion.

The post-Second World War period is often thought of as an era of 'flight into domesticity' during which feminism was at an all-time low and ideas of female sexuality were strongly affected by Freudian views about the primacy of the vaginal orgasm. In fact, some women doctors working within the marriage guidance and family planning movements were emphasizing an empirically-based approach to female sexual satisfaction within marriage which placed the clitoris as central to achieving this. However, there was a discernible trend to downplay the necessity of female pleasure and to exhort women to be agreeably compliant to their husbands' demands in the interests of the marriage as a whole. During this period, there is considerable concern about the growing amount of premarital sexual activity, with the concomitant problem of illegitimate births. Furthermore, the number of individuals marrying in all age-groups reaches an all-time high, as the average age at marriage drops to an all-time low. The single woman thus becomes a somewhat pathological failure rather than a victim of demographic imbalance.

This book augments Hall's already considerable contribution to the historiography of sexuality and gender. In short, a marvellous teaching resource, a stimulator (I hope) of further research into this neglected area of the history of sexuality, and just a fascinating read.

Gayle Davis
Centre for the History of Medicine
University of Glasgow

Responding to Global Terror

Three thousand people were killed, and several blocks were destroyed at the World Trade Centre on September 11, 2001. The world was changed. Governments have always been able to raise internal solidarity by fear of an external enemy. Now the enemy is terror that can be caused by only a few individuals.

More than three hundred thousand people were killed, and hundreds of square miles were devastated on 26 December 2004, by the Asian Tsunami. It too should change our response to the world. Many recent acts of Nature have killed even more people in one sweep. But the tsunami's impact has been different, for three reasons. It was the first great natural disaster to seriously involve affluent Westerners since the Lisbon earthquake. It shows dramatically what climate change is likely to do to the populous areas close to sea-level. It shows that Nature can still outdo anything dreadful that humans can do, although humans are catching up. So, as more hurricanes, droughts, floods, volcanoes, earthquakes and new diseases dramatically threaten our future, could the world's people unite in solidarity and fight them all? How much nearer to the heart of the developed world must nature's devastation come than the New Orleans hurricane, flooding of European rivers, and bushfires like measles? At some stage surely the armies of the world could be diverted into working with nature, and the armaments industries into battling her.

World aid is fighting against Nature's cruel Malthusian efforts to reduce human numbers, but one response could be humane efforts to tackle the drivers that increase overpopulation. It is becoming clear how much aid for devastated areas is swallowed up by population increase.

Women welcome aid that enables family planning, to reduce their own suffering and the deprivation of their living children. Mass public education could counter the religious and political pressures to multiply and the confounded cheek of western countries in seeking to raise their own fertility while economic refugees now number hundreds of millions. Global education includes promoting literacy, and spreading information through entertainment, books, and documentaries, about the natural enemies facing us all and opportunities for action not fatalism. Let the memes run and reach every ignorant corner. Popular websites could run easily readable one-page fact sheets and graphics, on population, energy, resources, and sharing resources, to prepare against our increasingly unpredictable natural dangers. There are so many myths out there to counter with the evidence.

A stable and prosperous population with a higher proportion of elderly is possible. It is possible to change the fatal flaw of global capitalism which pushes for continually growing markets and cheap labour. The worst bogeys are losses of fertile lands and seas, escalations of refugees, animal extinctions, oil and water wars, megaslums, toxic pollutions and exacerbating climate change.

In the past, Nature and humans themselves kept populations in check by inhumane means. In the past two hundred years since people have been able to improve their health and social behaviour, populations have soared, except where women have been able to control their own fertility.

Now it is time for everyone to be given a chance to understand that population growth can devastate their resources and quality of life, rather than be a weapon against their enemies, so that globally governments can work for the right of everyone to have a child of their own with a decent chance in life (= two per couple) - but not the right to multiply beyond bearing.

(For the record - estimated death tolls - famines not included.
1138 Syria - Aleppo, earthquake, 230,00
1556 China - Shaansi, earthquake, 830,000
1737 India - Calcutta, earthquake, 300,000
1887 China - Yellow River, flood, 1 million
1908 Italy - Messian, earthquake/floods 70,000-100,000
1923 Japan - Kanto, earthquake, 143,000
1948 Turkmenistan, earthquake, 300,000
1970 Bangladesh and East Pakistan, cyclone, 300,000
1976 China - Tangshan, earthquake, 255,000
1991 Bangladesh - cyclone 138,000.)

Valerie Yule

The Powers of Natural Selection

12. Combinatorial Selection in the Life Cycle

W.M.S.Russell

We can now consider the phenomena of specialisation and progress in the long-term evolution of phyletic lines. A specialising change fits a species more closely to its present environment, but limits further change outside a narrow directional beam. A progressive change, while being quite as adaptive (or more so) for the present environment, facilitates further change in any direction. (Russell, 1959) 'Progress consists in improvements which permit or facilitate further improvements.' (Huxley, 1954)

In individual behavioural evolution, the analogue of specialisation is conditioning, and the analogue of progress is learning. (Russell, 1988) Specialisation leads to inevitable extinction when the environment radically changes; as long as a line remains progressive, it continues to survive.

Specialisation need not be irreversible. There is what Sir Alister Hardy (1954) called *escape from specialisation*. He had seen the great evolutionary significance of a process discovered by his father-in-law Walter Garstang. It may happen that characters of the young, or more dramatically of the larva, are combined with characters of the mature adult. This can happen if the development of young or larval characters is delayed until after sexual maturity or metamorphosis. This is called paedomorphosis. If the young animal becomes sexually mature earlier than usual, it may enter the reproductive phase with all its young or larval characters. This is called neoteny. (de Beer, 1940) By the combination of juvenile or larval with adult characters, profoundly new evolutionary developments can be produced, however specialised the original adults had been. For the environments, and therefore the conditions of selection, are not necessarily the same for the young or larva and the adult.

The third form of combinatorial selection *exposes the gene pool to a variety of external environments in different phases of the life cycle*. (Russell, 1961) It is made possible by three things.

First, the genetic systems of larva and adult may be distinct. (Ford, 1975) Thus resistance to DDT is controlled by different genes in the larva and adult of the mosquito *Aedes aegypti*, and melanism in several moth species is controlled by different genes in the larva and adult, so that black larvae can give rise to pale adults, and *vice versa*. Ford notes that this is to be expected, since larvae and adults may lead such different lives that 'ecologically they correspond to distinct groups of organisms'. Second, and following from this, selection can be quite different, even reversed, in the two phases. The alleles controlling a spotting pattern on the wings of the butterfly *Maniola jurtina* are advantageous to the larvae and disadvantageous to the adults. (Ford, 1975) Third, the rates at which characters develop are themselves under genetic control, as has been demonstrated in the shrimp *Gammarus* and in goldfish. (de Beer, 1940) Natural selection can therefore bring together larval and adult characters selected in different conditions.

Combinatorial selection in the life-cycle can produce such spectacular changes that it has given rise to whole new orders, classes and even phyla of animals. The most striking example of this is the origin of the vertebrates from the simple marine invertebrates called tunicates. This has been worked out in detail by Berrill (1955) and may be summarised as follows. The most typical modern tunicates are as adults sessile animals, attached to the seabed like plants. But they are dispersed to new habitats by a mobile larva, equipped with a simple light-sensitive organ, a hollow nerve tube, a back-stiffener, the notochord, and swimming muscles in its tail. The adult is little more than a sack, its most complex organ being the endostyle, a device for filter-feeding (the larva does not feed). Several tunicate groups have, by neoteny, combined larval mobility with adult filter-feeding, and become pelagic animals.

The earliest vertebrate fossils are found in fresh-water deposits. Berrill supposes their ancestors were neotenous tunicates which moved up rivers, and for swimming up-current and finding their way acquired better musculature and *paired* light-receptors.

The resulting animals would closely resemble the very primitive fossil fish Jamoytius and the larva of the modern lamprey. They were still filer-feeders; jaws for eating large prey evolved later. The endostyle, no longer needed for feeding, evolved into the vertebrate thyroid gland.

Hardy (1954) and De Beer (1940) give many other examples of such evolutionary breakthroughs. The larval form of millipedes is very like the adult form of the insects, which probably began as neotenous millipedes. The Ctenophores may have begun as neotenous Turbellarians. Neoteny has been observed in many groups, such as urodele amphibians (the famous axolotl, a neotenous newt), the cricket *Gryllus campestris*, and the copepod crustacea. It has been detected in groups of invertebrate fossils – Trilobites, Ammonites, Nautiloids and Graptolites. Long ago, the Dutch anthropologist Bolk suggested *man* is a neotenous ape, and this has been amply confirmed. Montagu (1962) lists twenty-two characters adult human beings share with foetal but not adult apes. Aldous Huxley satirised the idea in his best novel, *After Many a Summer*, in which a couple who manage to live for two centuries (illogically but amusingly) are found to have turned into apes.

Letter to the Editor

Dear Editor

A Note on Paley's Argument

Your note on William Derham reminds me how Paley's argument is still usually treated as cogent. It is not. [1]

This is of importance today in view of the fashion for so-called "Intelligent Design".

In effect Paley's argument states that organisms appear to be designed for living; therefore there must be a designer. But organisms that did not appear to be designed for living could not exist. So that "they appear to be designed for living" implies no designer as it says no more than that they are alive.

Natural selection produces the appearance of design for living because it eliminates those that are less fit for living.

J.M. Thoday

1. John Thoday [1967] "Chance and purpose: A comment on Sir Alister Hardy's Gifford lectures". "Theoria to Theory" Vol. 2, first quarter pp 29-38.

The Systematizing Quotient and Intelligence

Patrick James

Introduction

Simon Baron-Cohen developed tests for the Asperger section of the autism spectrum and backed it with two sub-tests on "Empathy" and "Systematizing" thinking. Empathy scoring was low and systematizing high at the autism end of the personality spectrum.

This author applied the systematizing test to his own extended Pembrokeshire family in the hope that some light would be shed on inheritance.

Much of the family had already been tested for intelligence as represented by IQ, with a modified Ballard group test that had been used elsewhere, and proved to have a standard deviation of twenty. The test had been used on the subjects between the ages of sixteen and sixty and corrected for age. Those beyond eighty-five could not manage it at all.

For the "Systematizing Quotient" most women score around 24 and most men around 30 in Baron-Cohen's survey. For people with Asperger syndrome or high functioning autism, the score ranges from 50 to 80.

The study seeks to discover whether there is an association between IQ and SQ. Baron-Cohen believes that there are two mutually exclusive neural operating systems—one for systematizing thinking and the other using empathy. Either can function at a high level of intelligence but empathy tends to be used more by females and systematizing by males. This is not strictly a gender difference but may involve structural differences in the brain.

Method

Subjects were tested by questionnaire in their own homes or attended the author for measurement. They were long accustomed to suffering measurement by him and so were not under pressure. In all 108 people were used. A shortened pedigree is included. The statistical work was confirmed externally. No grant has been involved. The systematizing questionnaire is taken from Phil. Trans. R. London B (2003) with Baron-Cohen's permission.

Results

Table 1 shows the IQ and SQ score for the 52 females and 56 males for whom data is available.

The pedigree on page 8 shows the IQ/ SQ ratios for those members of the extended family for whom it has been measured.

The males had a mean IQ of 130.4 with a standard deviation of 17.5. They had a mean SQ of 29 with a standard deviation of 10.3.

The females had a mean IQ of 131.6 with a standard deviation of 12.0. They had a mean SQ of 24.6 with a standard deviation of 10.9.

If the subjects are ranked by SQ, males constitute 63% of the higher half but only 41% of the lower half.

The standard linear correlation between IQ and SQ for males is 0.3635 (significant at 99.3% level) and that for females is 0.1957 (not significant at 85% level). This is illustrated graphically in Figure 1.

No gender differences can be discerned in the type of degree taken.

Discussion and Conclusion

Simon Baron-Cohen considers that there are "male" and "female" types of brain operation not restricted to actual gender but involving systematic thinking on the one hand and empathizing with people on the other.

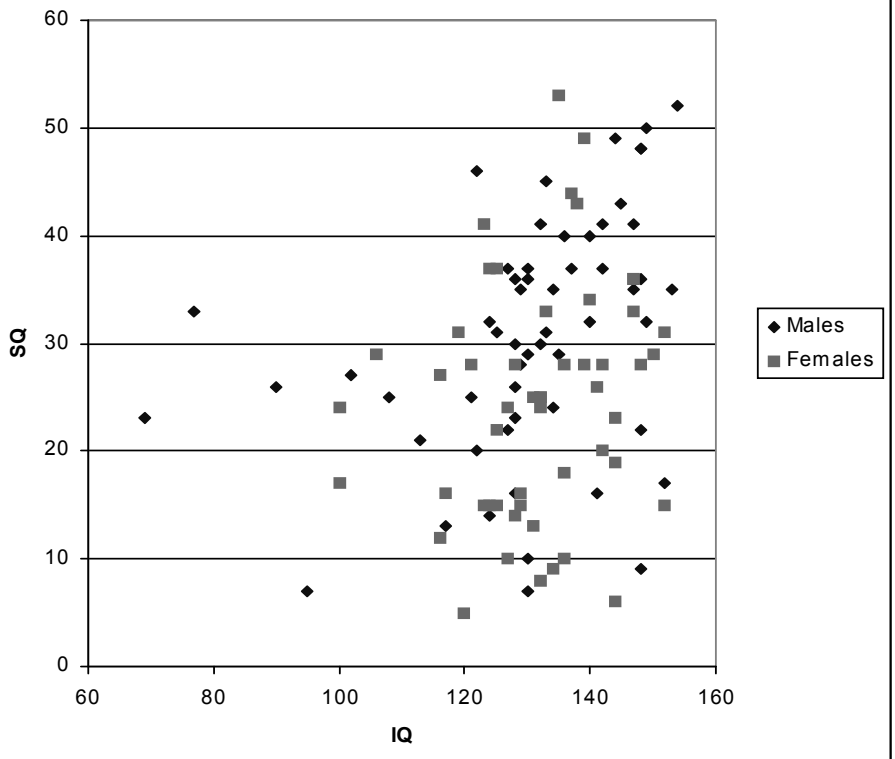
In the above study, using the systematizing test alone (we can consider that empathy test too transparent for our subjects who would "play" with it), a clear close relationship between IQ and SQ appeared at the high SQ level (which led to Asperger's syndrome). This association became less and less as the systematizing score dropped and, we presume, the empathizing quotient rose.

IQs at the lower end of the SQ ranking were nearly as high as at the top end – a J-shaped curve.

For the family as a whole, the mean IQ was 122 (SD 20) so that this group of subjects is somewhat selective – mostly those interested enough to respond. The lowest IQs appear in the middle of the range and it is suspected that the very lowest were to some extent autistic rather than mentally defective since one runs a successful business and the other a large and equally successful farm and has in fact sired a medically registered autistic child.

It would seem that successful brain-operation, or the old-fashioned *g*, can

Figure 1: SQ against IQ



provide a useful conduit for at least two opposed systems of thought.

This research has been done on one extended family. It would be ideal to involve more individuals across a wider range of subjects and in a different isolated or semi-isolated area.

As for inheritance, the shortened pedigree provided a little insight. Mid-range seemed to dominate when one links IQ to SQ, and a low IQ/SQ seems recessive. Six grades seemed ideal for genetics. One feels that there is little doubt that IQ and SQ share some important biochemical systems not involved with empathy but not necessarily suppressing intelligence. This would be in accordance with the fact that humans have relatively few genes and that these control a variety of late-developing faculties on an evolutionary scale, by linking up aspects of the mind.

It is generally assumed that the brain is still evolving and many species have at least two ways of facing a chaotic environment.

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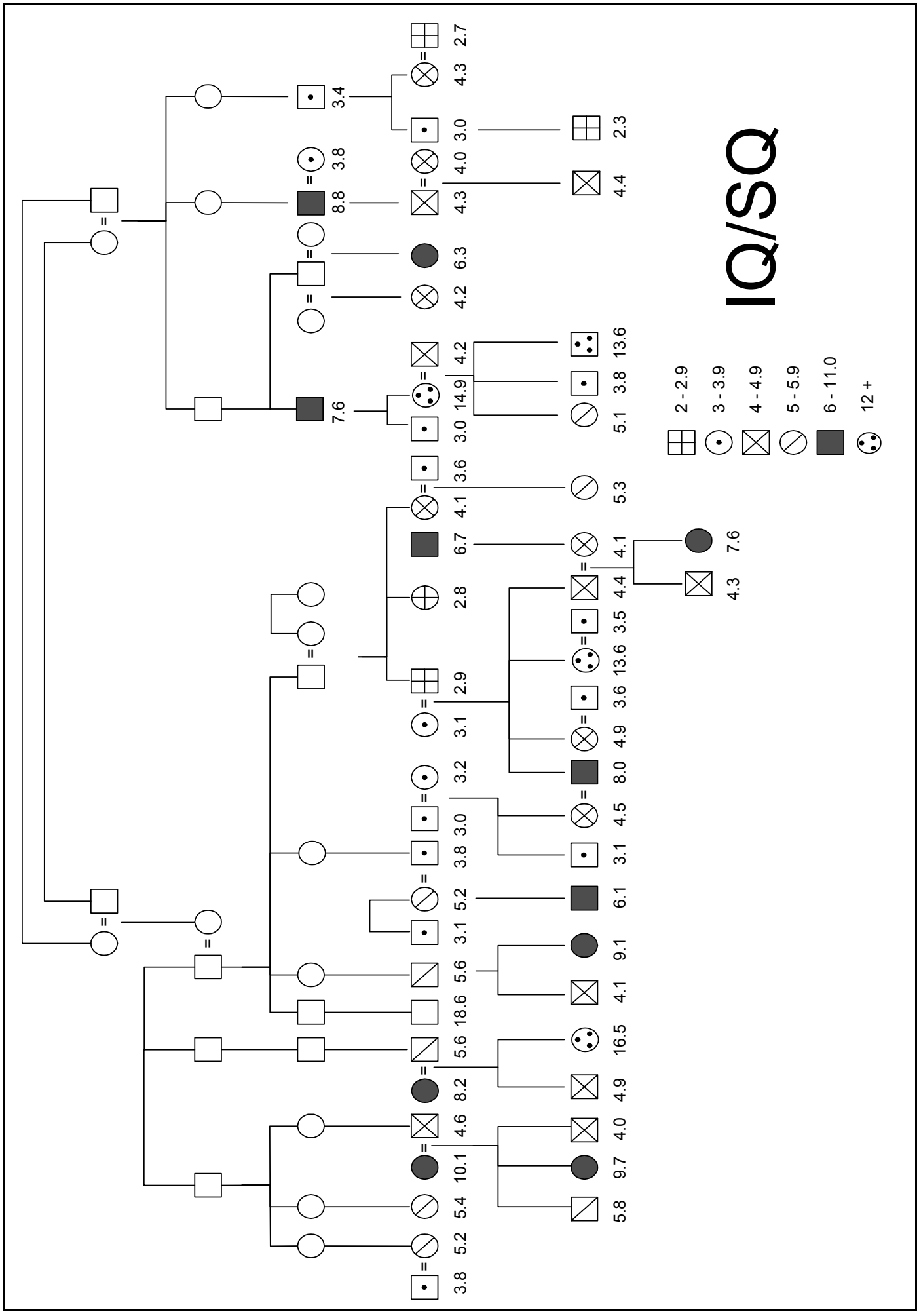
10. *Group Tests of Intelligence*. P.B. Ballard. U. London. 1957.

Table 1

Females					Males				
No.	SQ	IQ	IQ/SQ	First Degree	No.	SQ	IQ	IQ/SQ	First Degree
1	53	135	2.5		1	52	154	3.0	Medicine
2	49	139	2.8		2	50	149	3.0	Environment
3	44	137	3.1	Botany	3	49	144	2.9	Zoology
4	43	138	3.2		4	48	148	3.1	Physiology
5	41	123	3.0		5	48	148	3.1	Dentistry
6	37	124	3.4	Fine Arts	6	46	122	2.7	
7	37	125	3.4		7	45	133	3.0	
8	36	147	4.1	Maths	8	43	145	3.4	
9	36	147	4.1		9	41	132	3.2	
10	34	140	4.1	Photography	10	41	142	3.5	Economics
11	33	133	4.0	Sociology	11	40	136	3.4	Agriculture
12	33	147	4.5	Education	12	40	140	3.5	French
13	31	152	4.9	Law	12A	41	147	3.6	Logistics
14	31	119	3.8		13	37	137	3.7	
15	29	150	5.2		14	37	130	3.5	
16	29	106	3.7		15	37	142	3.8	Architecture
17	28	121	4.3		16	37	127	3.4	
18	28	139	5.0		17	36	128	3.6	
19	28	136	4.9	Biology	18	36	130	3.6	Chemistry
20	28	148	5.3	Astronomy	19	36	148	4.1	Catering
21	28	128	4.6		20	35	129	3.7	Sociology
22	28	142	5.1	Sociology	21	35	147	4.2	Law
23	27	116	4.3	Sociology	22	35	134	3.8	
24	26	141	5.4	Botany	23	35	153	4.4	
25	25	132	5.3	Sociology	24	33	77	2.3	
26	25	131	5.2		25	32	149	4.7	English
27	25	132	5.3		26	32	124	3.9	
28	24	132	5.5	Sociology	27	32	140	4.4	Photography
29	24	127	5.3		28	31	133	4.3	
30	24	100	4.2		29	31	125	4.0	Archeology
31	23	144	6.3	Education	30	30	132	4.4	Archeology
32	22	125	5.7		31	30	128	4.3	
33	20	142	7.1		32	29	130	4.5	
34	19	144	7.6	Fine Arts	33	29	135	4.7	
35	18	136	7.6		34	28	129	4.6	
36	17	100	5.9		35	27	102	3.8	
37	16	129	8.1		36	26	128	4.9	
38	16	117	7.3	Sociology	37	26	90	3.5	
39	15	123	8.2		38	25	121	4.8	
40	15	125	8.3		39	25	108	4.3	
41	15	129	8.6		40	24	134	5.6	
43	15	124	8.3		41	23	69	3.0	
44	15	152	10.1	Sociology	42	23	128	5.6	
45	14	128	9.1	Travel Industry	43	22	127	5.8	
46	13	131	10.1		44	22	148	6.7	Medicine
47	12	116	9.7		45	21	113	5.4	
48	10	127	12.7		46	20	122	6.1	Agriculture
49	10	136	13.6	Politics	47	17	152	8.9	Humanities (Geography)
50	9	134	14.9	Sociology	48	16	128	8.0	
51	8	132	16.5	Chemistry	49	16	141	8.8	
52	6	144	24.0	Speech Therapy	50	14	124	8.9	
53	5	120	24.0		51	13	117	9.0	
					52	10	130	13.0	
					53	9	148	16.4	
					54	7	130	18.6	
					55	7	95	13.6	


IQ/SQ
2 - 2.9
3 - 3.9
4 - 4.9
5 - 5.9
6 - 11.0
12 +