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a mitre for his relative when the King offered to fulfil his engagement. There were rumours that Batcombe was sequestered, and the Duke determined to enquire upon the spot. Dr. Jacob was high, and refused to give the Duke any satisfactory accounts. This produced the breach; but the Duke attended Dr. Jacob's funeral, and took his three children to Chandos House, with the intention of providing for them. The eldest was a little insane; the younger had an office in the household worth one way and the other about 1,300*l.* a year, which was all his support. The sister married General Dun, and had no issue.

"1818. May 7.—Dr. Steuart Cumming, a Scotchman who has been about twenty-three years in the medical department of the army, told me that he knows *for certain* that the author of *Waverley* and the other romances of the same hand is Greenfield, who succeeded Dr. Blair as lecturer on rhetoric and the *belles lettres* in the University of Edinbro'. This man was guilty of a crime which makes his name odious, and escaped prosecution by flight. He has since lived in close retirement in Northumberland. His family have taken the name of Rutherford, their mother's maiden name, and Dr. Cumming tells me that he knows that 3,000*l.* was settled by the father very lately upon each of his daughters out of the profits of those works. His correspondence with the printers was through Walter Scott.

"He also told me that Wardlawe of Glasgow was originally a draper in a town in Scotland where Dr. Cumming has property; and that Dr. Chalmers was at one time an itinerant lecturer in natural philosophy and a professed unbeliever.

"1818. May 8.—Spent great part of the day with the Rev. John Skinner, rector of Camerton. Mr. Skinner, like his great namesake, has applied himself much to etymology. He is now engaged in very extensive researches after the Roman remains in his parish. The Fosse way passes through it; and in the fields on each side Roman coins have been often turned up. He has had several men at work in these fields for some time past, who have laid bare the foundations of ten or twelve Roman houses, and have discovered a great many fibulae, coins, &c. Of the latter forty or fifty a day. Yesterday they found ninety, not in hoards, but dispersed. A hoard of six-and-twenty silver coins was found. Mr. Skinner keeps an exact account of each day's discovery, with drawings of the more interesting subjects. Many specimens of Roman pottery are found. The coins are in perfect series, from Drusus and Augustus to the last of the Emperors who possessed an authority in Britain; and coins which from their rude workmanship Mr. S. conceives to have been struck by the Britons in imitation of the Roman pieces.

"It is remarkable that the foundation of one of the houses extends under the Fosse."

J. J. CARTWRIGHT.

SELECTED BOOKS.

General Literature and Art.

BOUILLEVAUX, C. E. L'Annam et le Cambodge. Paris: Palmé.
FOUQUIÈRES, L. Becq de. Documents nouveaux relatifs à André Chénier, &c. Paris: Charpentier. 3 fr. 50 c.
MAGELLAN, First Voyage round the World by. Translated from the Accounts of Pigafetta, &c. Edited by Lord Stanley of Alderley. Hakluyt Society.
RAWLINSON, Sir H. England and Russia in the East. Murray.
REDGRAVE, R. and S. A Century of Painters of the English School. Smith, Elder & Co. 24*s.*
SAINTE-BEUVE, C. A. Premiers Lundis. T. 2. Paris: Michel Lévy. 3 fr. 50 c.
SCHLIEMANN, H. Troy and its Remains: a Narrative of Discoveries and Researches made on the Site of Ilium and in the Trojan Plain. Ed. P. Smith. Murray.

Theology.

HANDBUCH des biblischen Alterthums. [In parts.] Herausgeber, E. Riehm. Bielefeld: Velhagen und Klasing.
KAYSER, A. Das vorexilische Buch der Urgeschichte Israels. [Pentateuch criticism.] Strassburg: F. Schmidt.
VOLKMAR, G. Paulus Römerbrief. Zürich: Schabelitz. Mark 4.80.

History.

CAPPONI, G. Storia della repubblica di Firenze. Milano: Brigola.
DUVAL, L. Archives révolutionnaires du département de la Creuse (1789-1794). Guéret: imp. Betoulle. 10 fr.
FOUQUET, H. Histoire civile, politique et commerciale de Rouen, depuis les temps les plus reculés jusqu'à nos jours. 1re livr. Rouen: Métérie. 1 fr. 25 c.
LECOY DE LA MARCHE, A. Le Roi René, sa vie, son administration, ses travaux artistiques et littéraires. Paris: Firmin Didot.
LORIMER, P. John Knox and the Church of England. A Monograph, founded upon several important papers of Knox, never before published. King. 12*s.*
MERRUAU, C. Souvenirs de l'hôtel de ville de Paris, 1848-1852. Paris: Plon.
MONOD, G. Jules Michelet. Paris: Sandoz et Fischbacher.
PATTISON, Mark. Isaac Casaubon, 1559-1614. Longmans. 18*s.*
RANKE, L. v. A History of England, principally in the seventeenth century. Clarendon Press.
TAILLANDIER, Saint-René. Dix ans de l'histoire d'Allemagne. Origines du nouvel empire, d'après la correspondance de Frédéric-Guillaume IV. et du Baron de Bunsen, 1847-1857. Paris: Didier. 7 fr. 50 c.
WALLON, H. Saint Louis et son siècle. Paris: Hachette. 15 fr.
ZUNZ, J. M. Ir Ha-Zedek. Geschichte der Krakauer Rabbinate vom Anfange d. 16. Jahrhunderts bis auf die Gegenwart, als Beitrag zur Geschichte der Juden in Polen. Berlin: Benzian.

Physical Science.

BAILLON, H. Histoire des Plantes. T. 5. Paris: Hachette. 25 fr.
KINAHAN, G. H. Valleys and their relation to Fissures, Fractures, and Faults. Trübner.
REICHENBACH, H. G. Xenia orchidacea. Beiträge zur Kenntniss der Orchideen. 2. Bd. 1. Hft. Leipzig: Brockhaus. 2½ Thl.
SPÖRER, G. Beobachtungen der Sonnenflecken zu Anclam. Leipzig: Engelmann. 15 Thl.

Philology.

AHRENS, H. L. Disquisitio etymologica Ἀδὰξ u. Villa. Berlin: Calvary. 1 M. 60 Pf.
HOLTZMANN, A. Altdeutsche Grammatik, umfassend die goth., altnord. altdächs., angelächs. u. althochdeutsche Sprache. 1. Bd. 2. Abth. Leipzig: Brockhaus. 7 M.
ROHDE, A. De Philolai Pythagorei fragmento περὶ ψυχῆς. Berlin: Calvary. 1 M. 20 Pf.
ROSNY, L. de. San tsai tou houei. Les peuples de l'Indo-Chine et des pays voisins. Notices ethnographiques traduits du chinois. Paris: Maisonneuve. 2 fr. 50 c.

CORRESPONDENCE.

OUR OLDEST MANUSCRIPT, AND WHO MUTILATED IT.

Oxford: Jan. 25, 1875.

I must crave permission to make some remarks in explanation and reply to Mr. Renouf on the above. In explanation first. It is a misprint that makes me say, "Of this MS. alone, called ancient by Dionysius Exiguus." The latter clause has slipped out of place, and should have come earlier in the paragraph. What I wrote was, "That of the Prisca Versio, called ancient by Dionysius Exiguus," &c. My thanks are due to Mr. Renouf for enabling me to correct this; but then as "to the fact," which he supposes "has escaped my observation," in connexion with the date of the MS. itself, if he will be so good as to refer to my words a few lines on, he will see that I distinctly confine myself in this paper to the characteristics and contents of "*Vol. II.*," as I have called it—at any rate, that volume which alone contains the Prisca Versio. Mr. Renouf adds that I am "mistaken in talking of the Prisca Versio of the Sardican canons." Let not Mr. Renouf be too sure of that. It is a moot question in spite of what Dionysius says—and what I have quoted him as saying, too—whether the Sardican canons were published in Greek, or Latin, or both. The fact of their being included in the Prisca Versio rather indicates that, *as they stand there*, they were translated, like the rest in this volume, by its author from a Greek version. However, I am not aware that I have committed myself to anything beyond *the fact* that the author of this version, or at any rate the transcriber of this MS., reckons them at twenty, not twenty-one. I shall not pursue this point further now, but some day I trust to be able to convince Mr. Renouf that their genuineness in any form must be abandoned.

Next, as to Dr. Maassen. I have possessed his latest work for more than a year; and after writing my paper, carefully went through all he says about this MS. to see whether his account of it varied from my own. And the result was that I left my own unaltered. I am quite aware of the copies of the *Bibliotheca Juris Canonici* possessed by the Bodleian Library, and of the one to which he refers in particular. But this copy contains more than Dr. Maassen gives it credit for containing, and thereby disposes of his conclusion.

Mr. Renouf says: "There is not a particle of reason for doubting the strict accuracy of Baluze's narrative." But then, in the next breath, he propounds *a theory of his own* to invalidate the very reasons which I had assigned for doubting it—"a mistake of Baluze, who confounds the MS. now in the Bodleian with another MS. of C. Justel." . . And then: "I cannot help it if Pietro Ballerini was also misled by Baluze." Will Mr. Renouf be so good as to tell me where this other MS. of C. Justel is to be found. I have been looking them up with some care, and can find no other of his MSS. mentioned anywhere to which De Marca can be supposed to refer in either of the passages I have quoted from him, but this. Besides, this is not the *only* MS. which the Ballerini deliberately charge him with having misrepresented to their knowledge. Father Jones in the *Month* contends that the description, characterised by me as false, relates not to this MS., but to the collection. But how can this consist with the fact that De Marca doubted of the existence of such a collection till he had seen, and then only knew of in, this MS.? In conclusion, Mr. Renouf says: "The great question between the Justels and De Marca referred entirely to the rightful position of the Sardican decrees." I admit this is the account given of it by De Marca himself; but for this we want confirmation from other quarters, it being his own truthfulness that is impeached. It was his pen that traced what the editors of the *Bibliotheca* were required to say in their preface; and of this, the part relating to the missing leaves, "vetustate perierunt," was absolutely false on his own showing.

EDMUND S. FOULKES.

THE HERMIT OF RED COATS GREEN.

Belfast.

In a recent number of *Notes and Queries* Mr. Mortimer Collins says:—

"It may be interesting to note that I was told by the late George Hodder that Charles Dickens employed him to see this eccentric person and report on him, and that he never himself visited him."

As this is an old story which has been going about for years, and if true would not be very creditable to the veracity of Mr. Dickens, perhaps you will allow me to state in your columns that it is entirely untrue.

There is now before me a private letter from Charles Dickens, which I copy:—

"London: Twenty-seventh March, 1862.

"My dear Mr. Finlay,

"As you sent me your paper with that very cool account of myself in it, perhaps you want to know whether or no it is true. There is not a syllable of truth in it. I have never seen the person in question but once in my life, and then I was accompanied by Lord Orford, Mr. Arthur Helps, the Clerk of the Privy Council, my eldest daughter, and my sister-in-law; all of whom know perfectly well that nothing of the sort passed. It is a sheer invention of the wildest kind.

"Faithfully yours ever,

"CHARLES DICKENS."

That I may not be said to have made unauthorised use of a private letter, I copy, from another letter of the 31st of the same month, the following passage:—

"My dear Mr. Finlay,

"Make what use you like of my note. The custom of astonishingly audacious assertion that is gradually expanding in print cannot be too decisively 'put down.' . . .

"Faithfully yours always,

"CHARLES DICKENS."

The "very cool account" of himself was a letter from "A County Down Lady," published in *The Northern Whig* on March 24, 1862, in which she gave an account of a visit to "Tom

Tiddler's Ground" and an interview with "Mr. Mopes," the leading character in Mr. Dickens's story. The lady gave a very graphic sketch of the "Hermit," and closed with these sentences:—

"Charles Dickens offended him terribly. He pretended he was a Highlander, and Mr. Lucas at once began to question him about the country, and then spoke to him in Gaelic, which he could not reply to. Mr. Lucas said to him, "Sir, you are an impostor; you are no gentleman."

This Mr. Dickens declares to be "a sheer invention of the wildest kind" (letter of March 27, 1862); and he proceeds to state the names of those who were present when he had with the "Hermit" the now famous interview.

Frank Finlay.

The Editor *will be glad if the Secretaries of Institutions, and other persons concerned, will lend their aid in making this Calendar as complete as possible.*

APPOINTMENTS FOR NEXT WEEK.

Saturday, Jan. 30,	3 p.m.	Physical: Dr. A. Schuster on "Electrical Theories;" Mr. C. Bakewell "An Optical Bench."
	"	Royal Institution: Mr. J. T. Woodcock "The Discovery of the Temple of Diana, &c., at Ephesus."
	"	Crystal Palace Concert (Beethoven's Mass in C).
	"	Saturday Popular Concert, St. James's Hall (Billow).
Monday, Feb. 1,	2 p.m.	Royal Institution: General Monthly Meeting.
	4.30 p.m.	Musical Association: Mr. C. E. Stephens on "The Fallacies of Dr. Day's Theory of Harmony."
	5 p.m.	London Institution: Professor Ferrier on "Functions of the Brain," I.
	"	Entomological.
	8 p.m.	British Architects. Medical.
	"	Society of Arts: Cantor Lecture VI.
	"	Monday Popular Concert, St. James's Hall (Billow, Norman-Néruda).
Tuesday, Feb. 2,	3 p.m.	Royal Institution: Mr. E. Ray Lankester.
	8 p.m.	Civil Engineers: Professor Prestwich on "The Origin of the Chesil Bank."
	"	Society of Arts. Pathological.
	"	Royal Albert Hall: Orchestral Concert (Wilhelmj).
	8.30 p.m.	Zoological.
	"	Biblical Archæology: the Rev. A. H. Sayce on "Human Sacrifice among the Babylonians;" Herr P. J. Lauth on "The Date of the Nativity."
Wednesday, Feb. 3,	8 p.m.	Microscopical: Anniversary.
	"	Pharmaceutical. Obstetrical.
	"	Society of Arts.
	"	Mr. H. Holmes's Fifth Musical Evening, St. George's Hall.
Thursday, Feb. 4,	3 p.m.	Royal Institution: Professor Tyndall on "Subjects connected with Electricity."
	6.30 p.m.	Royal Society Club.
	7 p.m.	London Institution: Dr. Zerffi on "The Grotesque in Indian Art."
	8 p.m.	Linnean.
	8.30 p.m.	Royal. Antiquaries.
Friday, Feb. 5,	4 p.m.	Archæological Institute.
	7.30 p.m.	Geologists' Association.
	"	Sacred Harmonic Society, Exeter Hall (Mendelssohn's *Athalie*, &c.).
	8 p.m.	Royal Institution: Weekly Evening Meeting. 9 p.m. Mr. James Dewar on "The Physiological Action of Light."
	"	Philological: Professor J. B. Mayor on Rhythm." II.

SCIENCE.

RIBOT ON HEREDITY.

Heredity; a Psychological Study of its Phenomena, Laws, Causes, and Consequences. From the French of Th. Ribot, Author of "Contemporary English Psychology." (London: Henry S. King & Co., 1875.)

It may be affirmed with much truth that if we wish to learn what pursuit ranks highest in public opinion, we shall find it in the career of those men to whom statues are erected by public subscription. It happened that the writer of these lines not long since revisited Cambridge, where, as he walked admiringly among the many new improvements, his eyes fell upon a recently erected bronze statue. It was the only out-of-door statue in the whole town; it occupied a commanding position in the market-place, hard by the University Church, and only a few steps from being in full sight of the Senate House. He walked reverently up to it, pondering as he went as to the manner of the man whose memory it so proudly perpetuated, and lo! it was Mr. Jonas Webb of Babraham, the famous breeder of Southdown sheep. The erection of this statue by the agriculturists of a county in whose capital a great university happens to be located, is worthy of note. It expresses their genuine appreciation of the practical application of the laws of heredity to all descriptions of farm produce, and it may be accepted as an omen that the time is near when the study of those laws and of their logical consequences shall permeate the philosophy of the university. It must do so, because there is no branch of science which refers to bodily structure or to mental aptitudes, neither is there any theological doctrine in which the theory of heredity, either directly or as one of the principal agents in evolution, can hereafter be left out of consideration.

In the course of formation of every science there has always been an embryonic or pre-scientific period. Nothing then existed but detached pieces of evidence, of an unsatisfactory kind, laxly discussed and explained by wild hypotheses. But, at length, the methods of science succeeded in catching with a firm grip some of the loose materials, then more was seized, and so, with an ever-increasing rapidity of conquest, the whole of them became gathered together within the pale of law. Heredity has at the present time developed into a science; much is definitely established, and many questions seem to require for their solution little more than direct experiment or the simple but careful collection of statistical facts. There is consequently some need of a work that shall concisely and clearly set forth what is already known, and what are the undecided questions which most urgently call for solution and might at the same time be solved by any person, who chose to devote a fair amount of intelligent and steady work to the purpose.

M. Ribot's book does not do this; it is not a work on a level with the present knowledge, but it takes us back to the pre-scientific stage of heredity. It again brings to the light old anecdotes of questionable value, and again treats with seriousness, hypotheses that have become obsolete. Speaking generally, the work is that of a partially informed and very speculative writer, and by no means that of a man of science. It is written in a somewhat pretentious style, which has the effect of making the reader believe that some great discovery is about to be announced, and of fixing his attention until he reaches the end, when the deferred hope proves never to be realised. As examples of the kind of information which he freely accepts as evidence—among the illustrations of longevity, we are told that "a collier in Scotland prolonged his hard and dreary existence over one hundred and thirty-three years." We next have, as an example of exceedingly acute sense, a story extracted from Prosper Lucas, who was much too credulous of wonderful stories, of "Hirsch Daenemarck, a Polish Jew, who about the year 1840 travelled over Europe, showing by decisive experiments that he could read in a closed book any page or line that might be desired;" and of his son, aged ten, who "possessed this same faculty in perhaps a more remarkable degree." Curiously enough, I happen to know something about this very case, which was mentioned to me two years ago as an avowed instance of extraordinary memory. The subject of hereditary memory was and is of interest to me, and I therefore wrote to a very eminent and learned Jew, to whom I was referred for information. His reply lies before me: I do not repeat the names in his letter, as I did not ask permission to do so. This is an extract from it: "The feat to which you allude was performed by a Jewish rabbi, whose name, I think, was Hirsch Norwegen, who was popularly called the 'Sihas-Pole'—*i. e.*, the Talmud Pole ('Sihas' being composed of the initial letters of the Hebrew words meaning 'the six sections' of the Talmud), and who, travelling through the principal parts of Europe about the year 1848, astonished even such men as —— in Berlin, —— in Prague, and —— in Padua. He was not only able to tell the words which a pin thrust through one leaf in any part of the Talmud would pass on the next, but on any number of subsequent leaves." In fact, he had learnt the enormous work (thirty-six volumes) more or less by heart, through the aid of a local as well as verbal memory of wonderful power, devoted to that end only. My correspondent gave me particulars of another instance of extraordinary memory of the same kind that existed in his own family. His father, "when he was seven years old, could say by heart the whole of the Pentateuch in Hebrew, verse by verse, together with the remarks of the principal commentators, Farihi, Ebn Ezra, and Rashbam; and throughout life—he died aged seventy-seven—his knowledge of the vast Talmudical and Rabbinical literature was such that he was constantly appealed to for pointing out the sources of obscure references or allusions; and, in fact, he never seemed to forget anything—whether places, persons, facts, or ideas—with which he had once become acquainted." I have reason to believe that a powerful memory, exact in all matters of detail, is a characteristic of the Jewish race. M. Ribot says there is a lack of evidence to prove the heredity of strong memory; on the contrary, I find it abundant. It existed, as we have just been informed, in the family of Hirsch Daenemarck, and it exists in the family of my correspondent. But to proceed with M. Ribot's book. He quotes Le Vaillant on the half-breed children of the Europeans and Hottentots, that the moral nature is always determined by the father. When the *father* is a *Hottentot*, "the child has always the good nature and gentle and kindly affection of the father;" but, in the converse case, they have "the germs of all vices and unruly passions." (!) Again,

he quotes, apparently with perfect approval, the opinion "that there is an invariable connexion between the heredity of physical resemblance and the heredity of moral resemblance." I can only say that I have been so struck by the number of cases in which the child who had the features of either parent had *not* the character, that I should hardly be surprised if they proved to be the more numerous; but I have never as yet gone statistically into this question. Then he indulges in some absurd views about likeness descending through opposite sexes, and quotes approvingly a belief that the son is more like to his mother, and, through her, to his *grandfather*, than he is to his *father*.

The inaccuracy and feebleness of his deductions is, in many instances, very striking. Here is one which is perfectly inexcusable in a writer on heredity; he is speaking of the transmission of acquired habits, and uses an often published anecdote to prove his case. He says:—

"Habit is defined to be an acquired disposition. We ask if any purely individual habits are transmitted? Instances of this are cited. Girou de Buzareingues observes that he had known a man who had the habit, when in bed, of lying on his back and crossing the right leg over the left. One of his daughters had the same habit from birth."

The only meaning to be attached to this is, that the man had no special instinct to cross his legs, that from some cause or other he did so, that he acquired the habit of doing so, and that he transmitted this acquired habit by inheritance to his daughter. But what possible right has anyone to infer from the story, as it is told, that the man's habit was not just as instinctive as that of his daughter? Everybody who knows anything of heredity is well aware that one of the most interesting questions at the present time concerns the possibility of transmitting acquired habits. There are some few, very few, well-known instances of it in animals, but hardly any in man, while there are a vast number of other instances in which acquired habits are most assuredly not transmitted in any recognisable degree. The question is of extreme interest in its bearing upon the rate and *direction* of evolution, and therefore every bit of evidence about it deserves the closest scrutiny; but M. Ribot passes complacently on, careless and unconscious.

It is necessary to draw serious attention to the large amount of unacknowledged plagiarism which characterises this book. M. Ribot has been immensely indebted for its general design, and for very many facts, to the well-known work of Dr. Prosper Lucas, *Hérédité Naturelle*, as the reader will sufficiently recognise by comparing the two tables of contents, but I myself am aggrieved yet more directly. I find the tables and genealogies that I had compiled, after very considerable research and sifting, and which I published in *Hereditary Genius*, appropriated without a word of acknowledgment. They are clipped and condensed, and a trifling number of names are varied, but that is all, and M. Ribot thinks fit to give this plagiarised version of the families of the principal poets, painters, musicians, men of science and of literature, statesmen, and commanders, exactly as if they were the fruits of his own discrimination and research. Nay worse, he mentions in three separate cases out of the whole number of them, that the genealogy of those cases was given after me, thereby implying that I had nothing to do with the rest. It is the more vexatious because he shows himself incapable of making the most of the materials he has thus conveyed to his own use, as, for example, in his tables of maternal and paternal influence, where he quotes a few cases on either side merely as anecdotes, and does not attempt to work the subject quantitatively.

The book improves towards its close, because the topics with which that portion of it deals, are more in accordance with the bent of the author's mind. He develops with effect the views that have of late become familiar to English readers, of the large part played by unconscious cerebration in intellectual acts, and in one of his best passages he ascribes genius (as I myself have lately done, in ignorance that M. Ribot had anticipated me) to a large development of that portion of the mind. He says:—

"The highest creations of the imagination spring from the unconscious. Every great inventor, artist, man of science, artificer, feels within him an inspiration, an involuntary invasion, as it were, coming out of the depths of his being, but which is, as has been said, impersonal. All that comes under consciousness is results and not processes. The difference between talent and genius is the difference between the conscious and unconscious. Artists, prophets, martyrs, mystics, all those who in any degree have felt the *furor poeticus*, have ever acknowledged their subjection to a higher power than their own *ego*, and this power is the unconscious overlapping the submerged consciousness."

The word "talent" in the above is open to objection, because it is usually understood to mean an "instinctive gift," and instinctive motives are not necessarily "conscious." The phrase ought to run "between steady brain-work and genius." I may add, that a woman's intelligence appears to have a larger proportion of the unconscious element in it than the man's, for it is notorious that she frequently arrives at just conclusions, though the only reasons she is able to assign may be eminently illogical.

Much is said in the book about free will, but nothing worthy of note is advanced. There is also an eloquent passage about the decay of the Greek genius, which is ascribed to the effects of "nature," but unhappily, the author does not even profess to understand the meaning of that phrase. He says:—

"Clearly heredity has nothing to do with this decay; but then if it is transmitted to the next generation, and if, further, the same causes go on acting in the same direction, it is equally clear that heredity in turn becomes a cause of decay."

These "ifs" and the uncertain conclusion, and the general haze that overspreads the passage, are characteristic of the author's style of reasoning.

In conclusion, I would remark, that it is usually as profitless as it is an ungracious task to pick out the defects in a man's work. Both the critic who studies it for his own information, and the reader of his criticism want, or ought to want, nothing else than to learn all of sterling worth that it contains. But in the present instance, no choice seemed open to me but to find fault, for I laid down M. Ribot's volume after honestly reading every line of it, with a weary sense of many wasted hours. FRANCIS GALTON.

SCIENCE NOTES.

PHYSICS.

The Theory of Mouth Organ Pipes.—The process by which the air in an ordinary mouth organ pipe is set in motion is usually represented plausibly as follows:—The current of air which issues from a narrow slit comes in contact with a sharp edge on which it breaks, producing a hissing sound which is supposed to be made up of an unlimited number of notes each with an independent pitch of its own. The air-column of the pipe selects and strengthens that particular note of the confused sound with which it can vibrate synchronously, and renders it musical. According to another view of the matter, a portion of the air which issues from the slit and strikes against the lip of the pipe is urged into the pipe, there producing a compression which reacts on the air-current and deflects it. This phenomenon is repeated periodically, the length of the air column in the pipe determining the time of a vibration. M. Sneebeli, in *Pogg. Ann.* cliii. p. 301, describes experiments which induce him to regard the production of a note in a mouth organ pipe in a different light. He considers that the air current which issues from the slit builds there a sort of air-reed, whose action in the excitement of vibrations in the mass of air in the pipe is analogous to that of the tongue of a metal reed in an ordinary reed pipe. If the slit be adjustable and be so placed that the stream of air falls entirely on the outside of the lip, the pipe gives no sound until by pressure from without the air-formed reed is bent inwards. A similar application of external pressure is required to deflect the air-reed when the slit is so arranged that the current of air passes entirely inside the lip. In a series of letters recently published in *Nature*, Mr. Herman Smith has expressed views which appear to be in close agreement with those of M. Sneebeli.

Frigorific Effects produced by Capillarity combined with Evaporation.—Professor Decharme (*Annales de Chim. et de Phys.*, sér. v. tom. iii. p. 236) states that when a roll of bibulous paper is placed vertically with its lower extremity dipping into bisulphide of carbon, the liquid rises by capillary attraction, and after a few minutes the upper portion of the paper is covered with a layer of a white semi-crystalline substance which gradually extends downwards to within two centimètres of the surface of the liquid. The formation of this solid substance arrests the further capillary ascent of the bisulphide. The deposit was found on examination to be ice, its formation being due to the condensation of the aqueous vapour in the atmosphere, brought about by the cold resulting from the evaporation of the bisulphide of carbon over an extended porous surface. The temperature of the air at the time was 20°C., but the phenomenon was equally striking at higher temperatures, and even when the bisulphide of carbon was in a state of ebullition. When the bibulous paper enveloped the bulb of a thermometer, the temperature fell from 20° to −15°. The author proposes to employ an arrangement of this kind as a hygroscope. Water in a thin test-tube may be readily solidified in this way, the test-tube being enveloped in a roll of blotting-paper the extremity of which is dipped for a moment in bisulphide of carbon; according to the size of the test-tube and the quantity of water in it (less than five centimètres in height) will the time required for the solidification vary from two minutes to half an hour. If the bisulphide contains substances in solution (*e.g.*, sulphur, phosphorus, etc.), the same phenomenon takes place, with this exception, however, that the deposit

now contains a certain quantity of the matter dissolved. Effects similar, though not so striking, are produced when liquids with low boiling-points other than bisulphide of carbon, and when other porous solid bodies are employed.

The Freezing of Alcoholic Liquids and Wines.—The object of the experiments of M. Melsens (of which an abstract is given in the *Annales de Ch. et de Ph.* sér. v. tom. iii. p. 527) was to settle the question, about which different opinions have been expressed by observers, whether, when wine containing 10 or 12 per cent. of alcohol is frozen, the ice produced gives, on liquefaction, pure water or an alcoholic solution. According to the decisive statement of Boussingault, the ice gives, on being liquefied, an alcoholic liquid. M. Melsens, however, regards his experiments as having conclusively proved the contrary so far as the matter is of interest for practical or industrial purposes. The wine was placed in a freezing mixture, in which it became, as a whole, semi-solid. This mass consisted of a network of ice particles of pure water imprisoned in the liquid wine, like snow impregnated with coloured water. The solid particles were separated from the liquid wine by a centrifugal force turbine. In this way a large quantity of ice particles was obtained almost colourless, even when the wine operated on was red. The liquid obtained from the fusion of this ice was without taste, contained no appreciable quantity of alcohol, and only a small amount of organic matter soluble in water. The author is of opinion that the method of congelation may be efficaciously employed to improve poor wines by separating from them pure water.

Several points connected with the freezing of alcoholic solutions, incidentally noticed by M. Melsens, are very interesting, and some of them rather startling. We are somewhat startled, for instance, at learning that not only may brandy or rum be drunk (out of a wooden cup) at a temperature of thirty or thirty-five degrees below zero Centigrade without any disagreeable sensation of cold, but that even the mellowness of the beverage improves as its temperature is reduced. A paste of brandy or rum may be made at a temperature $-50°$ C., and is no colder on the tongue than an ordinary ice. If the temperature be pushed as low as $-71°$ C., the effect produced is similar to that of a spoonful of soup *a little too hot*.

Spectra of Metallic Solutions.—In the last published number of the *Annales de Ch. et de Ph.*, Messrs. Delachanal and Mermet describe a form of apparatus (spectro-electric tube or fulgurator) for the observation of the spectra of metallic solutions. It consists of a capillary tube traversed by a platinum wire, which moves in it with sufficient freedom to allow the liquid to flow through drop by drop. The capillary tube, surmounted by a reservoir containing the solution for examination, passes through the cork of a second larger tube placed immediately below it. Through the bottom of this latter passes the second platinum wire, the extremity of which is brought within a short distance of the extremity of the upper one, while the liquid drops between the two. The advantages claimed for this arrangement are that the spark has a fixed direction, and permits the prolonged observation of constant spectra; and secondly, that the electrodes are enclosed in a tube, and the spectroscope thus secured from chance of damage. Finally, by a special arrangement, the liquid employed is collected as it drops.

The Behaviour of Iron and Steel Bars in a Galvanic Circuit.—M. Hermann Herwig's experiments on the changes in the electric conductivity of iron and steel bars brought about by the passage of voltaic currents round and through them, and on the induction currents developed, described in *Pogg. Ann.* cliii. p. 115, are instructive and suggestive. The author first quotes and discusses the experiments of Villari (*Pogg. Ann.* cxxvi. p. 120, and cxxxvii. p. 569), who found that no change in the electric conductivity of iron rods took place in consequence of the magnetising effect of the current in the surrounding helix. Villari also observed that when a rod of iron through which a strong current had been passed was connected in a circuit with a galvanometer, and smartly struck, the galvanometer gave evidence of an induction current in the circuit, and Wiedemann showed that a similar effect is produced when the wire is twisted instead of struck. To determine the influence on the conductivity of the bar of the transversal (magnetising) currents, M. Herwig employed a modified Kirchhoff-Wheatstone Bridge. A bar of iron 170 centimètres long and 1 centimètre thick, was balanced against a copper bar 350 centimètres long, so that no current passed through the galvanometer. When now the battery circuit was suddenly broken, a strong momentary current passed through the galvanometer, the deflection of the needle being in the direction which would have been produced by a sudden diminution of the resistance of the iron. When the battery circuit was closed again, an equal momentary current in the opposite direction was produced. These were induction currents (extra-currents). With iron bars of various thicknesses balanced against the same copper bar, it was found that the thicker the bar the stronger was the extra-current. The extra-currents in the case of steel bars were much more feeble than in the case of iron, as Villari also found in his experiments cited above, the amount of difference varying with the hardness of the steel experimented on. In general with iron and steel rods, a small continuous increase of electric resistance with the continued passage of the current—more pronounced with iron than with steel—was observed. If the bars were allowed a long rest after a current had been passed through them for some time, they returned to their original state. This increase of electric resistance was observed in a great variety of cases, care being taken to eliminate changes of resistance due to changes of temperature. The direction in which the current passes through the iron or steel bars is of importance in considering the change of resistance. The resistance is greater in the direction in which the current has been passed for a considerable time than in the opposite direction. If the above experiments be tried with copper or brass instead of iron or steel, no such phenomena as those described are exhibited.

The news just received of the complete success of the English party for observing the Transit of Venus at Rodrigues is important, as southern stations are necessarily few, the islands being thinly scattered in a wide expanse of ocean. Both ingress and egress have been well observed at this island, which is more favourably situated than Mauritius or Bourbon; and Janssen's revolver apparatus for securing photographs at the instants of contact external and internal has worked well, nine plates, each containing sixty small photographs taken at intervals of a second, having been exposed at various phases of ingress and egress, besides fifty-eight ordinary plates. The success of the British enterprise is thus secured, independently of what has been done by other nations, even though the observations at Kerguelen Island should be lost. Ingress has been observed at the Sandwich Islands and at Rodrigues, and egress in Australia (which is practically equal to New Zealand, where the observations were unfortunately lost), and in Egypt, making two pairs of stations for comparison by Delisle's method; and, what is of very great importance, the eye observations have been supplemented by a large number of measures, near the times of contact, with Airy's double-image micrometer, the success of which has been perfect. As all nations have co-operated in the great work, it is satisfactory to find that this country has done its part well, and will be able to contribute to the general result sets of observations which are complete in themselves.

MEETINGS OF SOCIETIES.

Physical Society (*Saturday, January* 16).

Dr. J. H. Gladstone, F.R.S., President, in the Chair. Mr. W. H. Perkin, F.R.S., Mr. Lemann, and Mr. W. Bottomley, were elected Members of the Society. Dr. Gladstone read a paper on "The Electrolysis of Solutions of Metallic Chlorides," by himself and Mr. Tribe. The phenomena chiefly discussed were those which take place when a voltaic circuit is formed by means of platinum, a second metal, and a solution of the chloride of the second metal. With platinum, copper, and solution of cupric chloride, the result of the action was to cause a deposition of cuprous chloride upon both the platinum and the copper. With platinum, iron, and solution of ferric chloride, there was formation of ferrous chloride in contact with both metals. When mercury and solution of corrosive sublimate were used, there was similarly deposition of calomel on the mercury as well as on the platinum. With gold in place of platinum in conjunction with mercury and solution of corrosive sublimate, mercury was reduced to the metallic state in contact with the gold, and amalgam of gold was formed.—Professor Guthrie communicated the results of further experiments on crystalline hydrates formed at temperatures below 0° C., a class of substances termed by him *Cryohydrates*. The experiments, of which those now communicated are a continuation, were briefly reported in the Academy (see report of Physical Society's meeting on November 7, 1874). Among other results, Professor Guthrie finds that in freezing-mixtures, formed by mixing pounded ice with various soluble salts, the temperature of the mixture is, within very wide limits, independent of the proportions in which the ingredients are employed, or of the conditions under which they are mixed together. He also finds that, with very few exceptions (among about thirty salts examined), the temperature of a freezing mixture formed with a given salt is identical with the temperature of solidification of the corresponding cryohydrate; and that the lower the temperature at which a cryohydrate is formed, the smaller is the number of molecules of water contained in it in combination with one molecule of salt. Experiments on the freezing of mixtures of water and alcohol in various proportions (from 5 per cent. to 30 per cent. of alcohol by weight) showed that, for low percentages of alcohol, the depression of the temperature at which congelation begins below the freezing point of pure water is nearly proportional to the quantity of alcohol present. When dilute spirit is partially frozen, the crystals first deposited are almost pure ice, so that a concentration of spirit takes place in the portion remaining liquid; but with a mixture of four molecules of water with one molecule of alcohol (corresponding nearly to 59 per cent. water and 41 per cent. alcohol), the solidified portion and what remains liquid are identical in composition. When stronger spirit is cooled sufficiently to cause freezing to take place, the frozen part contains water and alcohol in the above proportions and the liquid part is pure alcohol. In fact, Professor Guthrie's experiments seem to show that a definite compound is formed by water and alcohol in the proportion of four molecules of water to one molecule of alcohol, and that spirit containing more alcohol than this is a solution of this compound in absolute alcohol, while that containing less alcohol is a solution of the same substance in water. The freezing point of the hydrate of alcohol in question is $-34°$ C. It was pointed out by Dr. Dupré, in the discussion which followed Professor Guthrie's paper, that four molecules of water to one of alcohol is the proportion in which the mixture of these substances is accompanied by the greatest evolution of heat.

Asiatic Society (*Monday, January* 18).

The Right Hon. Sir H. Bartle E. Frere, President, in the Chair. Mr. W. R. Cooper and M

THURSDAY, JULY 14, 1898.

EVOLUTION OF THE MORAL INSTINCT.

The Origin and Growth of the Moral Instinct. By Alexander Sutherland, M.A. Two vols. Pp. xiii + 461, and vi + 336. (London: Longmans, Green, and Co., 1898.)

MR. SUTHERLAND'S work is thoroughly Dar-

carrying the eggs in pouches, or attached to the body, or in the mouth, the average number is under 1000; while among those whose care takes the form of a uterine or quasi-uterine gestation which brings the young into the world alive, an average of fifty-six eggs is quite sufficient.

"It must hence be very evident how much better are a few that are tended than a great crowd left without care. And the first link in the chain of reasoning of this book is that in the struggle for existence an immense premium is placed upon parental care, and that not until this has been developed can the higher nervous types become possible."

There is another well-known way, as he points out, by which the life of the young is rendered more secure, namely by assuming mimetic characters and thereby escaping the observation of enemies. But successful mimicry leads to nothing further, and therefore does not enter into the plan of the present work.

He next examines into the case of amphibians and concludes that—

"Among all the non-parental species for which I have obtained information the number exceeds 800 eggs, yet the average of nine species that show parental care is only twenty-seven. Among the viviparous species the number of offspring declines to ten or less in the year."

Up to this point he considers that the story of evolution contains no indication whatever of the existence of real affection, but the true parental sympathy, which is destined to play a most important part in the survival of the nobler species, arises during the next stage.

Birds and mammals are understood to be developed from different points in the scale of reptile life, and the character of the protection they respectively give to their young differs accordingly. Some reptiles incubate their eggs, and birds carry on this process of incubation; other reptiles bring forth their young alive, and mammals follow that method. As their respective types advance in the scale of intelligence and affection, he shows that both birds and mammals present a lengthening period of parental protection, but the mammalian method reaches far ahead of that of the birds. It leads to the monkey, to the savage and to civilised man; the other seems to reach its acme in the bower bird.

In discussing birds, he divides them into three classes of progressive intelligence. The lowest contains the ostrich, emu, &c., which annually lay on the average twelve or thirteen eggs; the medium class includes partridges, petrels, coots, plovers and pigeons, these lay, on the general average, seven or eight eggs; the highest class includes birds of prey, parrots, woodpeckers, sparrows and finches, these lay, on a general average, four or five eggs a year. All birds of the higher grade

"hatch out young ones of abject helplessness, and the continuance of each species is absolutely dependent upon that parental love which is poured out in floods of unmeasured self-sacrifice. Among these birds the gracious charm of family life is first made fully known, and it is no mere chance that, concomitant therewith, comes that delight in throbbing melody which proclaims the fullest tide of joyous life. In all these genera, with their multitudinous species, male and female unite in their care for the tender brood, and show, as a rule, a steady attachment each for the other. Sometimes the male and

female brood on the eggs alternately; while one is sitting the other is not far off; but this occurs only in twenty-eight per cent. of the genera, and these are on the whole of somewhat inferior type. In sixty-five per cent. the female alone undertakes the brooding, but the male is, throughout, her faithful attendant, feeding her assiduously, driving away intruders, and cheering her with the joy of his tumultuous song. In accordance with the teachings of economics, we must regard this division of employment as a sign of progress." . . .

"That family life, which T. H. Green, in his 'Prolegomena to Ethics,' so justly regards as the ultimate basis of moral ideals (p. 257) . . . is faintly seen in a few fish; it is not wholly absent among reptiles, but it is for the first time distinctly observable among the lower birds, increasing ever as the type advances, till we find the nest-life of one of these higher birds to be marked by many graces of an indubitably moral character. The conjugal tenderness of the mated pair, and their unwearied self-sacrifice in ministering to the wants of their offspring, are ethically beautiful. Where these appear in an equal degree in the human couple, we reckon them as a solid fundamental element of goodness. Much else is required of man and woman, but it is no slight praise to say 'he was a kind husband and a devoted father,' or that 'she was a tender wife and a mother of unwearied love and self-sacrifice.'

"The family life, which we see so beautifully developed in these birds, is like the seed, enclosing within itself the full potentiality of all the ethic good to be developed in yet later stages, wherein a growing intelligence makes the young always more and more dependent upon family and social union."

Similarly in mammalian species, the number of offspring decreases with each successive stage of increasing intelligence and parental sympathy. It not only does so in the four orders of monotremes, marsupials, deciduate and non-deciduate placentalia, taken as wholes, but also when they are severally analysed in much detail. It is impossible to go further into this subject within the space at our disposal.

The portion of the book thus far noticed, is but a small part in bulk of the whole, but it will be of superior interest to those who are disposed to argue in a lazy offhand way, that after parental instinct had attained the level reached in the lower savages, its further evolution would be merely a matter of time and of favourable conditions. This was, however, by no means the feeling of the author, for he has taken very great pains and given much anthropological research to trace its actual steps. It is only possible here to give extracts from his summary.

"The process of moral development, as I see it, has been a slow dawning of parental sympathy, whence arises a simple and natural morality which is strengthened by the growth of the sense of duty and other accessory developments of sympathy. Out of the morality thus engendered springs whatever is moral in law, though, fundamentally, law is not moral but retaliatory."

One of the most interesting parts in the later portion of the book relates to the evolution of the sense of chastity. In the course of that discussion he treats lucidly and with great fairness many vexed questions concerning marriage in early times. He is in full concurrence with and gives important contributions to the present reaction against the excessive but clever dogmatisms of McLennan about the universality of marriage by capture, endogamy and exogamy, and the rest. But it is impossible to cope in a short article with the wide range of careful inquiry contained in this really remarkable book. Yet extensive as it is, some additional chapters have been written and afterwards omitted, as the author informs us. Others, too, might have been inserted; for instance, it would be very interesting to trace and describe the origin and purport of superstitious fears in human nature and their bearing on moral instinct.

F. G.

Duplicate

PEDIGREES.

THE trouble of compiling pedigrees and their unmanageable size led me to devise a method of recording relationships in a form suitable to my own particular wants. As it promises to answer exceedingly well, and to be of more extended utility, I venture to publish it.

The system of relationships between those who live or have lived in a long-established community is wide in extent, of indefinite depth, and interlaced in all directions. The problem is how to arrange its records so that when any individual is selected as a point of departure, it shall be easy to trace his relationships in every direction, whether ascending, descending, or collateral, so far as materials exist. The representation of such a system is wholly beyond the powers of a chart, but its object can be attained by breaking it up into what will be called "Family Groups," each of which slightly overlaps those with which it is immediately connected. A family group, in the sense used here, consists of (1) a parental couple, (2) all their sons and daughters, (3) the wives and husbands of them. Their names are supposed to be written on one page of a register, and the group, as a whole, to be defined by the No. of that page. The group is also defined and indexed under the joined surnames of the parental couple. I subjoin three specimen groups, but in a much abbreviated form for the sake of compactness,

Family Groups.

John Gore.	16 Feb.	31	101
Amy Myers.	24 Mar.	43	

Fred. Gore	101		Mary Drew	144	205
George Gore	101		Jane Boyle	136	211
Ellen Gore	101		John Piers	105	237
Susan Gore	101		*Unmar.*	—	—
Steph. Gore	101		*Unmar.*	—	—
Fanny Gore	101		Harry Pitt	163	223

George Drew.	14 Jan.	51	144
Eliz. Patten.	3 April.	62	

Harry Drew	144		Rose Spry	123	315
Mary Drew	144		1. Fred. Gore	101	328
" "	144		2. George Lewis	165	340

Fred. Gore.	26 Nov.	101	205
Mary Drew.	4 Oct.	144	

Frank Gore	205		Anne Fox	218	340
Amy Gore	205		James Moss	265	344
Anne Gore	205		*Unmar.*	—	—
Alex. Gore	205		Eva Sully	241	370
Rose Gore	205		Steph. Bell	270	315

only half a line being allotted to each individual. In reality, a short paragraph of full-length lines would be used, to admit of the entry of long names, and of such details as are commonly inserted in pedigrees. Taking group 205 as our subject for explanation, it will be observed that each of the five members of the fraternity—Frank, Amy, Anne, Alex. and Rose—bear the same register No. of 205, which defines that group. The justification for indexing them in the same group lies in the solidarity of each fraternity,

During the past century the Lyrids have been subjected to pretty close observation. The star shower seen in America on the morning of April 20, 1803—just 100 years ago—seems to have far excelled in brilliancy its Lyrid successors, though a display witnessed, it is supposed, in 1860 in the equatorial regions of Africa is described as having rivalled in splendour the November meteor-shower of 1866. Shooting stars were seen in unusual numbers in America on April 20, 1838, and Prof. Forshey observed a Lyrid display in Louisiana on the night of April 18, 1841, when he counted sixty meteors in 2½ hours, which gives a mean rate of twenty-four per hour for one observer. On the morning of April 21, 1863, these meteors were reckoned by an English observer as appearing at the rate of forty per hour. On the night of April 18, 1876, a party of American students casually noticed that shooting stars were unusually numerous during the hours 10 to 12. Lyrid meteors were also conspicuous on the night of April 20, 1874. Mr. Denning has recorded important appearances of Lyrid meteors in 1882 and 1884, especially in the latter year on the night of April 19. The same observer has also stated that the Lyrid radiant was unusually active in 1893 and 1901, in the former on the nights of April 20 and 21, and in the latter on that of April 21. The foregoing are the most important displays on record since April 20, 1803. Periods of somewhat different lengths have been proposed with respect to the Lyrid showers, but the true period seems to be one which overlaps, and consists of nineteen years. Thus, from 1803 to 1860, we have exactly three periods of nineteen years, and from 1803 to 1841, two periods of the same length. Again, thirty-eight years, or twice nineteen years, separate the showers of 1838 and 1876. The nineteen-year period also connects the displays of 1863 and 1882, of 1874 and 1893, and of 1882 and 1901. This nineteen-year cycle is specially interesting, as it is completed at the Lyrid epoch of the present year, reckoning from the somewhat important display of April 19, 1884. A calculation made by the writer indicates that the maximum in 1903 is on April 19, 10h. 30m. G.M.T. The Lyrid radiant ought therefore to be found active in the early part of the night of April 19, probably from the hours 9 to 12. There is no prospect of Lyrids being numerous on the nights of April 20 and 21.

JOHN R. HENRY.

UNLIKE the August Perseids, the Lyrid meteor-stream, like those of the Quadrantids, Orionids and Geminids in January, October and December, seldom exhibits an abundant shooting-star display, more nearly resembling in that respect the Leonid and Bielid meteor-systems than the stream of August Perseids, its materials appearing to be still collected in one or more dense clusters in its orbit. Its brightest as well as its ordinary apparitions are also, like those of the Leonids, of remarkably short duration, so as to be very liable to escape observation unless splendid enough to arrest attention at some observing station on the globe. The great shower seen in America on the morning of April 20, 1803, only lasted in full splendour for two hours, from 1h. to 3h. a.m.; and a rather sensational abundance of the Lyrids on the morning of April 21, 1863, was entirely confined to the night of April 20, when 11 meteors, chiefly Lyrids, were seen at Hawkhurst in 45m., and 7 bright and several smaller ones were observed in 30m. at Weston-super-mare, between 11h. and 12h., and in a quarter of an hour after 15h., at Hawkhurst, 11 shooting-star tracks were noted, the meteors falling too rapidly then in all directions to be all recorded; the radiant point obtained from that night's tracks, and from a few Lyrids mapped on April 19 (23 Lyrid paths together, some of which may perhaps really have diverged from other centres), was at 277½°+34½°, close to the position which was first obtained of it "near α Lyræ," by Prof. E. C. Herrick, in America, 24 years earlier, on the morning of April 19, 1839. On the preceding night, of April 19, the hourly rate of meteors from 10h. to 11h. was only ordinary, and on the night of April 22, not a single meteor was seen in an hour by either of two observers who watched the clear sky simultaneously from 11h. 15m. to 12h. 15m. in London and at Hawkhurst for hoped-for accordances.

Records of bright Lyrid showers are therefore of peculiar interest, as they may not improbably represent clusters of meteor-dust along the Lyrid stream, like some which appear

all its members having the same parents, grandparents, uncles and aunts, and every other ascending or collateral relationship. It is not strictly so as regards descent, because the children of each brother or sister are nephews or nieces to all the others, but this material exception leads practically to no confusion. A fraternity is, therefore, treated as a compound unit, the individuals who form it being distinguished by their several names. Thus Rose Gore, 205, serves as a complete definition of her. The husbands and wives of the fraternity 205 belong severally to fraternities of their own, the numbers of which are attached to their names; thus the husband of Rose Gore, 205, is Stephen Bell, 270. Her father, Fred Gore, belongs to group 101, and her mother, Mary Drew, to group 144. Both of these latter groups are printed here. Each parental couple heads a new group; thus, Fred. Gore, 101, and Mary Drew, 144, combine to form the head of the new group 205. Similarly, Rose Gore, 205, and Stephen Bell, 270, form that of the new group 315. It must be clearly understood that there is no relation between these numbers as such; they indicate no more than the No. of the page on which the new group happens to be entered. Every individual who is married and has children is entered in at least three different family groups, (1) that of his own fraternity, (2) in that of his wife, (3) in that in which he appears as one of the parental couple. If he marries a second time and has children, his name will appear as a parent in a fourth group, thus Mary Drew, 144, is entered as mother in each of the two groups 328 and 340. It will be noticed that the day and month of birth is added to the name of each parent. This is a useful distinction in some Welsh and Scotch pedigrees where the same names repeatedly occur. It is a distinction of great efficacy, as the chance against a namesake having the same birthday is about 365 to 1. If so, the chance against a namesake *couple* having the same birthdays as the couple in question would be 365×365, or upwards of 130,000, to 1.

Employment of the Tables.—Let us follow out the relationships of Frank Gore, 205, as far as these three tables permit. His father, as we know, is Fred. Gore, 101. Referring to 101, we see that his paternal grandfather and grandmother are John Gore, 31, and Amy Myers, 43, respectively, so we should have to refer to the family groups 31 and 43, which are not given here, to know more about them and their own near relations. We see that Frank Gore, 205, has two paternal uncles, George and Stephen; George married Jane Boyle, 136, and has the children described in 211; Stephen is unmarried. Frank has also three paternal aunts, Ellen, Susan and Fanny; the second unmarried, Ellen married to John Piers, who has children in 237, and Fanny married to Harry Pitt, 163, who has children in 223. Jane Boyle's immediate relations are to be found in 136, those of John Piers in 237, and those of Harry Pitt in 163. The fraternities 211, 237 and 223 exhaust the list of Frank Gore's first cousins on the paternal side. The group 144 enables an equally complete analysis to be made on the maternal side. We can proceed in this way step by step as far as material exists. Intermarriages create no difficulty. The extreme confusion that arises from the ambiguous words of uncle, aunt, cousin, &c., is wholly eliminated by this method of working, also that which is due to half-blood relationships.

It should be remarked that information is usually to be obtained with ease concerning any particular family group, because a knowledge of its details is shared by many persons. The father and the mother each know, of course, the names of their own children, and of those to whom they are married, in all but very exceptional cases. Similarly each brother and sister knows the full Christian name of his father and mother, and the mother's maiden name also, as well as the names and order of birth of his or her own brothers and sisters. This same knowledge is usually shared by the brothers- and sisters-in-law.

This method of fraternal unities and of family groups may be applicable to experiments in breeding animals and plants, but with modification of detail appropriate to each case. Where the breeding season is brief, the birthday would be of small distinctive value, even when the year of birth is added to it. FRANCIS GALTON.

But these lists, valuable as they are, contain but a very small portion of the results we may hope for. The committees on sections used in ship building, on locomotives, and on electrical plant, each appeal to an enormous industry, and in each of these there is much that can be standardised. Take, for example, the various sizes and speeds used in dynamos and motors, the numerous voltages in electric light and power systems, and the varying frequencies of alternators. The committee on electrical plant, of which Sir Wm. Preece is chairman, has subcommittees on electric generators, motors, and transformers under Colonel Crompton, on telegraphs and telephones under Mr. Gavey, and on cables under Mr. R. K. Gray.

[redacted]

to with the greatest interest was the electric railway from Lecco to Sondrio and Chiavenna on the Ganz system, as it forms a bold experiment, and is the first of its kind. The total length is sixty-three miles. The electric energy is generated by three-phase machines at 20,000 volts, and is transformed down at nine points along the line to 3000 volts, this comparatively high voltage being taken direct by the trolley to the motors. Voltage as high as this necessitates many unusual precautions of an interesting kind; for example, the rheostats and switches are worked pneumatically, so that the driver does not operate direct any apparatus subject to high tension. The method of coupling up the motors is also interesting from its novelty. Instead of working the motors in the usual way, they are divided into high and low tension motors. The high pressure current is taken only to the stators of the high tension motors; the rotors of these machines are used to supply low tension three-phase current to the stators of the low tension motors. The low tension motors are thus supplied with current at a lower frequency than the main current. This "cascade" method of working is continued until half speed is attained, when the low tension motors are cut out and full speed is reached on the high tension motors alone.

The recent arbitration, in which it was decided not to use the Ganz system for the Metropolitan Railway, is still fresh in the minds of most people. Although this system does not seem so suitable for cases in which the acceleration at starting and the speed must be high, it should certainly afford a cheap method of working long lines not having much traffic. As seen at Valtellina, the ease and smoothness of working were all that could be desired.

On looking at the boldness of the experiment, one cannot help being struck by the difference between Italy and our own country in taking up a thing of this kind. But it must not be forgotten that one of our greatest sources of wealth tends to keep us from using electrical methods. If the price of coal were double its present value, which is the sort of price which holds in Italy, then the coal bill would be a larger proportion of the whole cost, and it would be more worth while to attempt a saving.

The usual form of electric traction by means of direct current at 650 volts, transformed from high tension three-phase, was seen on the line from Milan to Gallarate and Porto Ceresio. This line is forty-seven miles in length, and also differs from that to Valtellina in having much heavier traffic and higher speeds, and in being partly worked by steam. It is therefore of great interest to those who are at present considering the electrical working of our main lines.

Overhead lines are, of course, a feature of every long-distance transmission. It does not seem to be generally realised how much we have to pay for putting all conductors underground, though this subject will no doubt come forward more prominently when our large power distribution companies get really to work. One disadvantage of overhead lines is that they are subject to lightning discharges. Many protecting devices have been tried, and a particularly interesting one was seen at the Monbegno generating station on the Valtellina line. It consisted of jets of water forming a permanent earth, but of such a resistance that the loss does not amount to more than about 2 kilowatts. The action is said to be very satisfactory.

At Milan several large works were visited, and also the Royal Technical Institute. The latter is not very large, but is usefully equipped. The room for electrical measurements contains instruments in one group for measuring all the usual quantities over a wide range. In the motor and dynamo testing room the

has been urged that Michelson's absolute values should be used for the construction of an *absolute* scale, but Prof. Hartmann points out that the adoption of this idea would necessitate a wholesale revision each time a new estimate of the absolute wave-lengths was made.

In lieu of this he again suggests that the wave-length of the red line in the cadmium spark spectrum in air at +20° C. and 760 mm. pressure be adopted as $\lambda = 6438{\cdot}6911$ for all time, and that a coordination of a system of *relative* wave-lengths should be made with this as the standard.

The most urgent need before such a system can be completed is that an observer having the control of a large grating spectrograph shall continue Kayser's work in establishing a system of standard iron lines in the region as yet untouched by that observer. This need supplied, the values obtained by Michelson, Hamy, Fabry and Perot for a number of metals would furnish the connecting links for the completion of the proposed system.

SATURN'S NINTH SATELLITE.—From a note by Prof. E. C. Pickering in No. 3962 of the *Astronomische Nachrichten*, it appears that the position angles and distances of the satellite Phœbe, which were recently published in a Kiel *Circular*, were obtained from an ephemeris corrected to agree with the positions determined from eleven photographs obtained by Prof. Frost at Arequipa. These allowed the path of the satellite to be followed from April 16 to June 9.

Nature Aug 11 1904

DISTRIBUTION OF SUCCESSES AND OF NATURAL ABILITY AMONG THE KINSFOLK OF FELLOWS OF THE ROYAL SOCIETY.

THE result of this inquiry is to prove the existence of a small number of more or less isolated hereditary centres, round which a large part of the total ability of the nation is clustered, with a closeness that rapidly diminishes as the distance of kinship from its centre increases.

The materials are derived from the replies to a circular which I sent with a blank schedule, to all fellows of the Royal Society, asking for the names and achievements of their "noteworthy" kinsfolk in each degree of near kinship as specified in the schedule. Noteworthiness was defined as including any success that was, in the opinion of the sender, at least equal in its way to that in which the honour of a fellowship of the Royal Society is held by scientific men.

Returns are still dropping in, and now exceed two hundred. They continue to be very acceptable, but I judged it best to content myself with the number received up to a date when I could conveniently work at them, and to publish preliminary results without longer delay. The total number of returns received up to the date in question, that contained one or more noteworthy kinsfolk, was 110.

Subjoined are classified lists of the qualifications that were considered by one or other of the 110 correspondents as warrants of noteworthiness. I attached to each of these more or less noteworthy kinsmen (for my own private use in this inquiry) a *, a +, a −, or a o, signifying respectively 3, 2, 1, or no marks. In doing this, account was taken of honours, of biographical notices, and of the context of the communication, which often helped in deciding cases. Only one of these symbols was allotted to each individual.

*A List.—Mostly recipients either of a * or a +.*

Ministers of State, Heads of Departments, Permanent Secretaries, and other high posts in public offices. Member of Parliament, but subject to reservation.
Foreign Ambassador or Minister, Consul General, Secretary of Legation.
Governor of a Colony, Colonial Secretary, high Colonial Office.
Admiral or General in important command, high Staff appointments.
Clerical dignitaries, eminent ministers, philanthropists.
Legal dignitaries at home and in the colonies.
Medical men of distinction.
Professors in great universities, heads of the more important colleges and schools. University scholarships, first or second place in class lists of universities or in competitive examinations for Woolwich, Indian Civil, or principal home services.
Distinction in any form of Art—as poet, musician, singer; architect sculptor; painter, engraver, caricaturist; actor.
President or secretary of great institutions connected with science, literature, art, or purposes of public utility.
Authorship of a standard work, editorship of an important journal, authorship of valuable memoirs.
Inventor in any branch, scientific traveller.
Founder of a great business, management of great commercial undertakings, pioneer of a new industry.

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IN the *Physical Review* for June, E. L. Nichols and Ernest Merritt give an experimental confirmation of Lommel's contradiction of Stokes's law that, in fluorescence, the fluorescent light is always of greater wave-length than the exciting light. The variation in the intensity of the light throughout the fluorescence spectra of such substances as fluorescein, eosin, and naphthalene-red was measured by means of a spectrophotometer, and it is shown that, whatever be the wave-length of the exciting light, the curve connecting intensity of light with wave-length in the fluorescence spectrum is always of the same character. The maximum of intensity in the excited spectrum may have a wave-length much smaller than that of the exciting source. Thus in the case of eosin, with an exciting light of wave-length λ 585–605, the maximum in the fluorescence spectrum is at λ 580, the whole spectrum extending from λ 535 to λ 640.

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B List.—Useful to corroborate and to check.

Honours:—From the Crown—as knighthood and all superior orders. From public bodies—as honorary university degrees, Fellowship of Royal Society (all F.R.S. were granted a *), of Royal Academy, and other selected associations.

Biographical notices—as in Dictionary of National Biography and in other standard collections. Obituary and other notices in the journals of literary and scientific societies. Special memoirs. Men of the time; Who's Who?

C List.—Personal estimates taken into account.

Prominent county man. Active in public affairs, successful in business. Forward in civic matters. Good professional position. Of high repute as a scholar, &c.

D List.—Referring wholly to women.

A social leader. Great force of character. Reputed very clever. Artistic (in any way) to an exceptional degree. Successful work in educational, civic and philanthropic matters was also taken into account. Brilliant prize winnings at school or college. The following are examples of the more suggestive returns (but slightly modified). "I have no hesitation in judging her to be 'noteworthy.'" "Acquisitive mind of a high order." "Learned both Greek and Hebrew unassisted." "Had a great and recognised influence in forming the character of her (distinguished) sons." "Helped her husband greatly in his (standard) work."

E List.—Referring to youths only, and reaching at most the qualification of –

Good place in examinations, though lower than the very high ones mentioned above. School scholarships and exhibitions of fair importance.

Much less difficulty was experienced in assigning marks than had been anticipated. The totals of the number given were 183 of *, 188 of +, 83 of –.

The 183 * included 23 fellows of the Royal Society. Brothers were only counted once.

Abbreviations used in the schedule are employed here also, to distinguish different kinds of kinship that bear the same popular names, as uncles and first cousins. They are convenient, and seem to have been easily understood. They were first suggested by me in NATURE of January 28 of this year:—*bro*=brother; *da*=daughter; *fa*=father; *Hu*=husband; *me*=mother; *si*=sister; *so* or *son*=son; *Wi*=wife. *fa bro son* means "MY father's brother's son IS"; *me da* means "MY mother's daughter IS"; *so Wi bro* means "MY son's wife's brother IS," &c.

The total amount of marks that were thus assigned to each grade of kinship are given in Table I. For example, out of the 110 *fa fa fa* of the 110 senders, 3 were allotted a *, 1 a +, and none a –. Out of the 110 *fa* the corresponding numbers were 27, 25, 5.

TABLE I.—*Distribution of Symbols and of Indices of Success among the Kinsfolk of the* 110 *Senders.*

	Kinship			Symbols * (2)	+ (1)	–	Indices of success
	fa	*fa*	*fa*	3	1	—	11
	fa	*fa*	*bro*	8	1	—	26
	fa	*me*	*bro*	1	—	—	3
		fa	*fa*	16	8	3	67
		fa	*bro*	11	15	3	66
		fa	*si*	1	4	1	19
		fa	*me*	—	1	3	5
			fa	27	25	5	136
			bro	37	21	17	170
Half brothers		*fa*	*son*	3	3	—	15
		me	*son*	—	—	—	—
		bro	*son*	4	11	2	36
		bro	*da*	—	2	—	4
	fa	*bro*	*son*	10	7	1	45
	fa	*bro*	*da*	—	—	1	1
	fa	*si*	*son*	5	3	4	25
	fa	*si*	*da*	—	2	1	5
			son	1	16	14	49
	me	*fa*	*fa*	2	1	—	5
	me	*fa*	*bro*	3	1	—	11
	me	*me*	*bro*	1	1	—	5
		me	*fa*	13	8	3	58
		me	*bro*	11	14	3	64
		me	*si*	—	4	1	9
		me	*me*	1	3	1	10
			me	4	4	4	24
			si	3	6	5	26
Half sisters		*fa*	*da*	—	—	—	—
		me	*da*	—	—	—	—
		si	*son*	1	4	1	12
		si	*da*	1	1	1	6
	me	*bro*	*son*	9	9	1	46
	me	*bro*	*da*	1	1	—	5
	me	*si*	*son*	6	5	3	31
	me	*si*	*da*	—	—	—	—
			da	—	6	5	17

Total 183 of *, 188 of +, 83 of –.

Examples:—the index for *fa fa fa* is equal to 3 multiplied into 3, *plus* 2 multiplied into 1, =9+2, =11; that for *si son* is equal to (1×3, +4×2, +1×1)=3+8+1=12.

Tables II. and III. are based on Table I.

TABLE II.—*Successes of Kinsmen of Fellows of the Royal Society.*

A.—Through Male lines.		B.—Through Female lines.	
Kinship	Index of successes	Kinship	Index of successes
fa fa bro	26	*me me bro*	5
fa bro son	45	*me si son*	31
fa fa	67	*me fa*	58
fa bro	66	*me bro*	64
	204		158

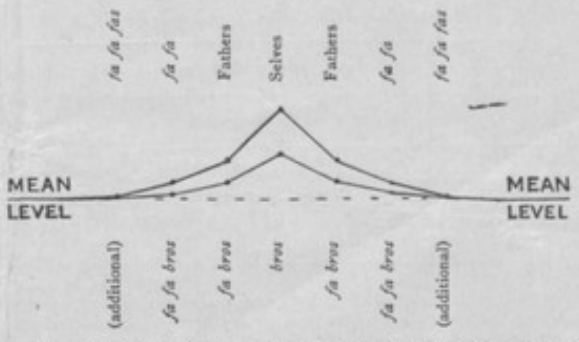
A popular notion that ability is mainly transmitted through female lines is more than contradicted by these figures.

The families of the fellows of the Royal Society must be fertile, because the number of brothers, whether of selves or of fathers, came out closely as 2·43. I will not now pursue the analysis, as the other kinds of kinship are hardly numerous enough in the present collection to justify conclusions.

TABLE III.—*Indices of Success among near Kinsmen in Ascending Generations of the* 110 *Contributors.*

110 persons in each class				Brothers of 110 persons in each class		
Generation	Kinship	Observed indices	Accepted indices	Kinship	Observed indices	Accepted indices
I.	Selves	330	330	Brothers	170	170
II.	fathers	136	136	*fa bros*	66	65
				me bros	64	
III.	*fa fa*	67	69	*fa fa bros*	26	26
	me fa	58		*me me bros*	5	
Additional	*fa fa fa*	11		*fa me bros*	3	
				me me bros	5	

Distribution of Success in the Families of Successful Men (from Table III.)



The upper line of the diagram indicates the successes of direct male ancestors, the lower line those of their brothers. The mean level of the community was inferred from the fact that it cannot be higher than the lowest entries in Table III., so far as these are to be trusted, and that these would be of barely perceptible magnitude in the small diagram.

Relation of Success to Natural Ability.—The success of

a man is wholly due to the combined effect of Natural Gifts and of Circumstances. More, however, being included under the title of natural gifts than can influence success, this part may be disregarded. The remainder comprises intellectual power, appropriate tastes, a persevering disposition, and much else, forming a large group which will be briefly termed "Natural Ability." The Circumstances, so far as they affect success, include healthy rearing, family and social influences, education, money, leisure, and surroundings that encourage work or idleness.

Men whose histories are known can be sorted with rough fairness, and with little difficulty, into three grades of natural ability, one-third of the whole number being classed as "above mediocrity" and marked +1, another third being classed as "mediocre" and marked 0, the remaining third being classed as "below mediocrity" and marked −1. After this has been done and the results recorded, the same men may be sorted afresh and independently into three grades, according to their Circumstances, one-third of them consisting of those whose circumstances conduced to success and are marked +1, the other thirds being respectively marked 0 and −1 on the principle already explained. Assuming for the moment (the question will be discussed later on), first, that Natural Ability and Circumstance are independent, and, secondly, that the mark for Success will always be equal to the sum of those for Ability and Circumstance, then the relation of Success to Ability is easily found. A square table (Table IV.) is made with three columns and three horizontal bands; it consequently contains nine compartments. The "arguments" at the head of the several columns will be +1, 0, −1; so will be those that precede the several bands. Then an entry is made in each compartment equal to the sum of its two arguments. The next step is to sort the successes in order of their values, annexing to each the various grades of ability that have been associated with it, and to enter the averages of them at the side as in Table V.

TABLE IV.—*Distribution of Successes, under the assumption that each differs little from that of the sum of its two variable constituents, and that these vary independently.*

Circumstance	Natural ability		
	+1	0	−1
+1	+2	+1	0
0	+1	0	−1
−1	0	−1	−2

The entries in the body of the table represent the Successes. Each is the sum of its two arguments, which refer respectively to Natural Ability and to Circumstance.

TABLE V.—(*Extracted from Table IV.*)

Grades of success	Associated grades of natural ability			
	All of the observed values			Average values
+2	+1	—	—	+1
+1	0	+1	—	+½
0	−1	0	+1	0
−1	−1	0	—	−½
−2	−1	—	—	−1

The result is that the average quantity of exceptional ability which is associated with any given amount of exceptional success is exactly its half. This same conclusion is reached by an *a priori* argument. Thus, let S, A, C be three independent variables, and $S = \frac{1}{2}(A+C)$. Then if C be unknown, its *average value* will be mediocrity, that is, =0. Consequently S will *on the average* be associated with $\frac{1}{2}(A+0)$, that is, with $\frac{1}{2}A$. There is a uniform rate of regression towards mediocrity. The same will take place if the cases are sorted in such proportions that the mediocrities shall be twice as numerous as either of the extreme groups. The table will then have four columns and four bands, with the arguments +1, 0, 0, −1, and it will have sixteen compartments. The result will still be the same if the mediocrities should be thrice as numerous as either of the extreme groups, and so on.

The two assumptions that have been made with the purpose of giving a rough idea of what would really occur must now be justified so far as may be. The first assumption was that natural ability and circumstance may be treated as *independent* variables. This position would be indefensible if we were making a precise analysis, because the two are certainly correlated to some extent. Thus a bright attractive boy receives more favour, and thereby has more opportunities of getting on in life, than a dull and unpleasing one, but these advantages are not unmixed with drawbacks; attractiveness leads to social distractions, such as have ruined many promising careers. The amusing couplet of Henry Taylor is worth quoting:—"Me, God's mercy spared, from social snares with ease Saved by the gracious gift, ineptitude to please." Another instance of correlation is that the disposition to intellectual effort being heritable, a naturally studious boy is frequently brought up in a family whose influence and opportunities develop his natural bent; similarly as to natural scapegraces. But my returns here and elsewhere show that home influences are much less potent than might be supposed. Many correspondents speak of themselves as the only members of their family who had tastes like their own, and kinsfolk win distinction in many different directions. Moreover, a reaction against the monotony of home influences is often shown by those strong characters whose tastes are not in complete harmony with them. The correlation between natural aptitude and the circumstances favourable to success is consequently less strict than appears at first sight, and to the best of my judgment is not worth regarding in a rough inquiry.

The other assumption was that success is equal to the simple sum of natural ability and favouring circumstance. On the contrary, it must be some slightly complex and discontinuous function of it. Still, the fact remains that a gifted child is more likely to succeed under conditions that are on the whole favourable to success than otherwise. The obvious objection that circumstances favourable to the development of one class of mind may be prejudicial to that of another is met by supposing a preliminary grouping of the men according to their dominant tendencies, scientific, scholastic, artistic, devotional, militant, and so forth, and treating these groups separately, each with its appropriate classification of circumstance. Little more is asked for than that natural ability and circumstance, as reasonably interpreted, shall be considered *cumulative*, in a broad and general sense, in their power of leading to success. It follows from this that any "exceptionality" of natural ability will, on the average, be roughly proportional but inferior to the exceptionality of the accompanying success. Also that the two will agree in direction, good ability going with high success, poor ability with the reverse. Rare exceptions do not invalidate general conclusions, any more than the fact of one boy in a class of schoolmates dying very early or very late invalidates the expectation of life at school ages as calculated by actuaries.

Exceptionally Gifted Families.—The diagram would assure us, even if we had no other grounds for assurance, that exceptionally gifted families must exist, whose race is a valuable asset to the nation. A few of these have been indicated by the present returns; they well deserve, and will probably receive, a full description hereafter. It must suffice for the present to mention the existence of at least nine gifted families connected with fellows of the Royal Society, two or three of whom are exceptionally gifted. I will conclude with the remark that the experience gained through this inquiry has strongly confirmed an opinion expressed in my lecture on Eugenics before the Sociological Society, of which an abstract appeared in these columns (vol. lxx. p. 82), namely, that it would be both feasible and advantageous to make a register of gifted families. I have now better hope of being able to carry some such design into effect.

FRANCIS GALTON.

the second child, but there is no conclusive evidence that after a mother has had two children there is any change in her tendencies.

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PART ii. of the *Bulletin* of the French Physical Society for 1904 contains a description by A. Turpain of a new apparatus for cleaning large quantities of mercury. The cleaning agent is a solution of mercurous nitrate, and the mercury, after being cleaned, is dried by means of concentrated sulphuric acid, any free acid in the mercury being subsequently removed by potash. The apparatus works automatically during long periods, and needs little attention.

IN the July number of the *American Journal of Science* Mr. H. A. Bumstead describes experiments on atmospheric radio-activity, which indicate that the activity acquired by a negatively charged wire exposed in the open air at New Haven, is of a two-fold character. From the rate of decay it is concluded that thorium as well as radium excited activity is present. With a three-hour exposure of the wire, 3 to 5 per cent. of the initial effect is due to the thorium activity, and with a twelve-hour exposure the thorium activity is sometimes 15 per cent. of the whole. Messrs. Trowbridge and Rollins communicate that the electrical resistance of an aluminium wire is not altered to a measurable extent when subjected to the action of radium.

THE *Geographical Journal* for August contains a very clear map showing the work of the National Antarctic Expedition. The map is the work of Lieut. Mulock, R.N., who joined the *Discovery* from the *Morning* in February, 1903. The positions fixed by observations, magnetic variations, soundings, heights, and the tracks of the sledge travellers are clearly shown, as well as the track of the ship to her furthest point along the coast of King Edward VII. Land. An inset map shows the position of the discoveries with reference to the circumpolar area. The same number also contains the paper on "The German Antarctic Expedition" which was read before the Royal Geographical Society in April last by Dr. E. von Drygalski. It is illustrated by some remarkable reproductions of photographs of icebergs, &c.

THE current *Century Magazine* contains two contributions which should be of interest to all students of nature, one, by that careful American observer, John Burroughs, on "What do Animals Know?" in the course of which a good deal of out-of-the-way knowledge is given in a charming manner, the other, illustrated by some striking engravings (one in colour), on "The Colossal Bridges of Utah," which deals with the wonderful arches or natural bridges that are to be found near the head of White Cañon, in San Juan County, Utah. One of these bridges, named by the discoverers the Caroline, measures two hundred and eight feet six inches from buttress to buttress across the bottom of the cañon. Its height is one hundred and ninety-seven feet from the surface of the water, while its thickness at its highest point is one hundred and twenty-five feet. The floor of the bridge is one hundred and twenty-seven feet wide, so that, as is pointed out, an army could march over it in columns of companies, and still leave room at the side for a continuous stream of artillery and baggage waggons. Two other magnificent bridges, named respectively the Augusta Bridge and the Little Bridge, are described and figured in the article, which is well worth perusal.

OUR ASTRONOMICAL COLUMN.

EPHEMERIS FOR ENCKE'S COMET.—A set of elements for Encke's comet, corrected only for the Jupiter perturbations of the first order between 1901 and 1904, is published by MM. Kaminsky and Ocoulitsch in No. 3962 of the *Astronomische Nachrichten*. These elements are given below, together with an extract from a daily ephemeris for the period August 1 to October 16:—

Epoch and Osculation 1904 *November* 9·0 (*M.T. Berlin*).

$$\left.\begin{array}{rl} M = & 341\ 3\ 39 \\ \pi = & 159\ 2\ 39 \\ \Omega = & 334\ 27\ 8 \\ i = & 12\ 35\ 37 \end{array}\right\} 1904{\cdot}0$$

$$\varphi = 57\ 54\ 20$$
$$\mu = 1075''{\cdot}666$$
$$\log a = 0{\cdot}34555$$
$$T = 1905 \text{ Jan. } 11\text{d. } 8{\cdot}8\text{h. M.T. Berlin.}$$

Ephemeris 0h. (*M.T. Berlin*).

1904		α (app.)	δ (app.)	log r	log Δ
		h. m. s.	° ′ ″		
Aug. 13	...	1 51 3	+21 10·2	0·3685	0·2634
,, 17	...	1 52 13	+21 45·0	0·3615	0·2421
,, 21	...	1 52 57	+22 19·8	0·3542	0·2201
,, 25	...	1 53 14	+22 55·1	0·3467	0·1970
,, 29	...	1 52 59	+23 30·4	0·3390	0·1732
Sept. 2	...	1 52 9	+24 5·7	0·3309	0·1485
,, 4	...	1 51 28	+24 23·4	0·3268	0·1358
,, 6	...	1 50 36	+24 41·2	0·3226	0·1229

THE REVISION OF THE CAPE PHOTOGRAPHIC DURCHMUSTERUNG.—In the third volume of the Cape Durchmusterung Sir David Gill referred to several lists of stars which Prof. Kapteyn had prepared in order that the objects might be re-observed and the origins of the discrepancies between the Cape and other catalogues discovered. The work of revision was commenced by Mr. Finlay, but has been continued, since 1896, by Mr. Innes. Parts i., ii., and iii. of vol. ix. of the Cape Observatory *Annals* contain the results of this revision, giving the observer's full notes and copious remarks concerning each object observed. Mr. Innes believes that not a single uncoloured star of the ninth magnitude or brighter, and south of declination −19°, is now missing from the catalogue.

Many of the questionable objects have been found to be variables or highly coloured, whilst others are fainter than the ninth magnitude. Part ii. is especially devoted to full particulars of each variable star observed at the Cape between 1896 and 1902, the elements, the curve, the region-charts, and all the available information—or references to the same—being given for each of the seventy-three objects observed.

A summary of the number of stars in the C.P.D. exhibits several interesting points. For example, whereas M. Stratonoff found that the B.D. (dec. +90° to −20°) gave a mean of 4·895 stars brighter than the ninth magnitude for every square degree, the corresponding value in the C.P.D. (dec. −19° to −90°) is 5·85. Part of this difference, at least, may, however, be due to a difference of magnitude standards. The total number of stars now contained in the C.P.D. is 91,358, and the richest region is near to η Argus, for in the −59° zone, between 10h. and 11h., there are 256 stars, or 32·7 per square degree, brighter than the ninth magnitude.

Part iii. tabulates, and comments on, the errors found by Prof. Kapteyn—and others discovered since—in other southern star catalogues for the regions south of dec. −19°, and concludes with a table of reference to all the published errata.

DETERMINATION OF LATITUDE AND ITS VARIATIONS.—In No. 3962 of the *Astronomische Nachrichten* M. E. Bijl, of the Royal Belgian Observatory at Uccle, gives the results of 685 determinations of latitude made by him during the period 1898·4–1899·5. The table given shows the time of each observation and the corresponding latitudes as deduced from the star positions given in the Berliner Jahrbuch and Newcomb's catalogue respectively. There is a constantly positive value for the difference Newcomb-B.J. of something of the order of +0″·6. The resulting latitudes show a range of about 0″·7 with a maximum at 1888·6, a minimum at 1889·0, and a lower maximum at 1889·3–1889·4.

THE STANDARDISATION OF ROWLAND'S WAVE-LENGTHS.—In an article appearing in No. 1, vol. xx., of the *Astrophysical Journal*, Prof. Hartmann answers the criticisms which have been passed on the proposals of his previous article, wherein he strongly urged the standardisation of Rowland's wave-lengths to a uniform *relative* scale. It has been urged that Michelson's absolute values should be used for the construction of an *absolute* scale, but Prof. Hartmann points out that the adoption of this idea would necessitate a wholesale revision each time a new estimate of the absolute wave-lengths was made.

In lieu of this he again suggests that the wave-length of the red line in the cadmium spark spectrum in air at +20° C. and 760 mm. pressure be adopted as λ=6438·6911 for all time, and that a coordination of a system of *relative* wave-lengths should be made with this as the standard.

The most urgent need before such a system can be completed is that an observer having the control of a large grating spectrograph shall continue Kayser's work in establishing a system of standard iron lines in the region as yet untouched by that observer. This need supplied, the values obtained by Michelson, Hamy, Fabry and Perot for a number of metals would furnish the connecting links for the completion of the proposed system.

SATURN'S NINTH SATELLITE.—From a note by Prof. E. C. Pickering in No. 3962 of the *Astronomische Nachrichten*, it appears that the position angles and distances of the satellite Phœbe, which were recently published in a Kiel *Circular*, were obtained from an ephemeris corrected to agree with the positions determined from eleven photographs obtained by Prof. Frost at Arequipa. These allowed the path of the satellite to be followed from April 16 to June 9.

DISTRIBUTION OF SUCCESSES AND OF NATURAL ABILITY AMONG THE KINSFOLK OF FELLOWS OF THE ROYAL SOCIETY.

THE result of this inquiry is to prove the existence of a small number of more or less isolated hereditary centres, round which a large part of the total ability of the nation is clustered, with a closeness that rapidly diminishes as the distance of kinship from its centre increases.

The materials are derived from the replies to a circular which I sent with a blank schedule, to all fellows of the Royal Society, asking for the names and achievements of their "noteworthy" kinsfolk in each degree of near kinship as specified in the schedule. Noteworthiness was defined as including any success that was, in the opinion of the sender, at least equal in its way to that in which the honour of a fellowship of the Royal Society is held by scientific men.

Returns are still dropping in, and now exceed two hundred. They continue to be very acceptable, but I judged it best to content myself with the number received up to a date when I could conveniently work at them, and to publish preliminary results without longer delay. The total number of returns received up to the date in question, that contained one or more noteworthy kinsfolk, was 110.

Subjoined are classified lists of the qualifications that were considered by one or other of the 110 correspondents as warrants of noteworthiness. I attached to each of these more or less noteworthy kinsmen (for my own private use in this inquiry) a *, a +, a −, or a o, signifying respectively 3, 2, 1, or no marks. In doing this, account was taken of honours, of biographical notices, and of the context of the communication, which often helped in deciding cases. Only one of these symbols was allotted to each individual.

*A List.—Mostly recipients either of a * or a +.*

Ministers of State, Heads of Departments, Permanent Secretaries, and other high posts in public offices. Member of Parliament, but subject to reservation.
Foreign Ambassador or Minister, Consul General, Secretary of Legation.
Governor of a Colony, Colonial Secretary, high Colonial Office.
Admiral or General in important command, high Staff appointments.
Clerical dignitaries, eminent ministers, philanthropists.
Legal dignitaries at home and in the colonies.
Medical men of distinction.
Professors in great universities, heads of the more important colleges and schools. University scholarships, first or second place in class lists of universities or in competitive examinations for Woolwich, Indian Civil, or principal home services.
Distinction in any form of Art—as poet, musician, singer; architect sculptor; painter, engraver, caricaturi-t; actor.
President or secretary of great institutions connected with science, literature, art, or purposes of public utility.
Authorship of a standard work, editorship of an important journal, authorship of valuable memoirs.
Inventor in any branch, scientific traveller.
Founder of a great business, management of great commercial undertakings, pioneer of a new industry.

B List.—Useful to corroborate and to check.

Honours:—From the Crown—as knighthood and all superior orders. From public bodies—as honorary university degrees, Fellowship of Royal Society (all F.R.S. were granted a *), of Royal Academy, and other selected associations.

Biographical notices—as in Dictionary of National Biography and in other standard collections. Obituary and other notices in the journals of literary and scientific societies. Special memoirs. Men of the time; Who's Who?

C List.—Personal estimates taken into account.

Prominent county man. Active in public affairs, successful in business. Forward in civic matters. Good professional position. Of high repute as a scholar, &c.

D List.—Referring wholly to women.

A social leader. Great force of character. Reputed very clever. Artistic (in any way) to an exceptional degree. Successful work in educational, civic and philanthropic matters was also taken into account. Brilliant prize winnings at school or college. The following are examples of the more suggestive returns (but slightly modified). "I have no hesitation in judging her to be 'noteworthy.'" "Acquisitive mind of a high order." "Learned both Greek and Hebrew unassisted." "Had a great and recognised influence in forming the character of her (distinguished) sons." "Helped her husband greatly in his (standard) work."

E List.—Referring to youths only, and reaching at most the qualification of –

Good place in examinations, though lower than the very high ones mentioned above. School scholarships and exhibitions of fair importance.

Much less difficulty was experienced in assigning marks than had been anticipated. The totals of the number given were 183 of *, 188 of +, 83 of –.

The 183 * included 23 fellows of the Royal Society. Brothers were only counted once.

Abbreviations used in the schedule are employed here also, to distinguish different kinds of kinship that bear the same popular names, as uncles and first cousins. They are convenient, and seem to have been easily understood. They were first suggested by me in NATURE of January 28 of this year:—*bro* = brother; *da* = daughter; *fa* = father; *Hu* = husband; *me* = mother; *si* = sister; *so* or *son* = son; *Wi* = wife. *fa bro son* means "MY father's brother's son IS"; *me da* means "MY mother's daughter IS"; *so Wi bro* means "MY son's wife's brother IS," &c.

The total amount of marks that were thus assigned to each grade of kinship are given in Table I. For example, out of the 110 *fa fa fa* of the 110 senders, 3 were allotted a *, 1 a +, and none a –. Out of the 110 *fa* the corresponding numbers were 27, 25, 5.

TABLE I.—*Distribution of Symbols and of Indices of Success among the Kinsfolk of the* 110 *Senders.*

	Kinship			Symbols *	+	–	Indices of success
				3	2	1	
	fa	*fa*	*fa*	3	1	—	11
	fa	*fa*	*bro*	8	1	—	26
	fa	*me*	*bro*	1	—	—	3
		fa	*fa*	16	8	3	67
		fa	*bro*	11	15	3	66
		fa	*si*	1	4	1	12
		fa	*me*	—	1	3	5
			fa	27	25	5	136
			bro	37	21	17	170
Half brothers	*fa*		*son*	3	3	—	15
	me		*son*	—	—	—	—
		bro	*son*	4	11	2	36
		bro	*da*	—	2	—	4
	fa	*bro*	*son*	10	7	1	45
	fa	*bro*	*da*	—	—	1	1
	fa	*si*	*son*	5	3	4	25
	fa	*si*	*da*	—	2	1	5
			son	1	16	14	49
	me	*fa*	*fa*	2	1	—	5
	me	*fa*	*bro*	3	1	—	11
	me	*me*	*bro*	1	1	—	5
		me	*fa*	13	8	3	58
		me	*bro*	11	14	3	64
		me	*si*	—	4	1	9
		me	*me*	1	3	1	10
			me	4	4	4	24
			si	3	6	5	26
Half sisters	*fa*		*da*	—	—	—	—
	me		*da*	—	—	—	—
		si	*son*	1	4	1	12
		si	*da*	1	1	1	6
	me	*bro*	*son*	9	9	1	46
	me	*bro*	*da*	1	1	—	5
	me	*si*	*son*	6	5	3	31
	me	*si*	*da*	—	—	—	—
			da	—	6	5	17

Total 183 of *, 188 of +, 83 of –.

Examples:—the index for *fa fa fa* is equal to 3 multiplied into 3, *plus* 2 multiplied into 1, =9+2, =11; that for *si son* is equal to (1×3, +4×2, +1×1)=3+8+1=12.

Tables II. and III. are based on Table I.

TABLE II.—*Successes of Kinsmen of Fellows of the Royal Society.*

A.—Through Male lines.		B.—Through Female lines.	
Kinship	Index of successes	Kinship	Index of successes
fa fa bro	26	*me me bro*	5
fa bro son	45	*me si son*	31
fa fa	67	*me fa*	58
fa bro	66	*me bro*	64
	204		158

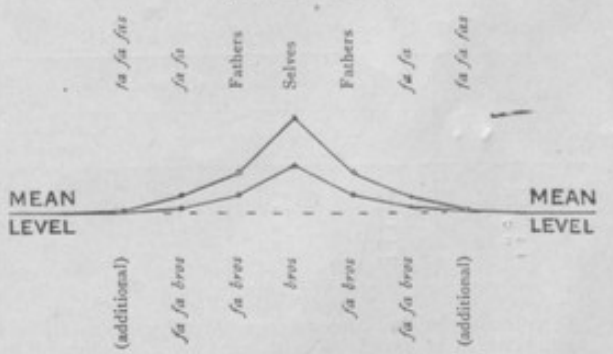
A popular notion that ability is mainly transmitted through female lines is more than contradicted by these figures.

The families of the fellows of the Royal Society must be fertile, because the number of brothers, whether of selves or of fathers, came out closely as 2·43. I will not now pursue the analysis, as the other kinds of kinship are hardly numerous enough in the present collection to justify conclusions.

TABLE III.—*Indices of Success among near Kinsmen in Ascending Generations of the* 110 *Contributors.*

110 persons in each class				Brothers of 110 persons in each class		
Generation	Kinship	Observed indices	Accepted indices	Kinship	Observed indices	Accepted indices
I.	Selves	330	330	Brothers	170	170
II.	fathers	136	136	*fa bros*	66	65
				me bros	64	
III.	*fa fa*	67	62	*fa fa bros*	26	16
	me fa	58		*me me bros*	5	
Additional	*fa fa fa*	11		*fa me bros*	3	
				me me bros	5	

Distribution of Success in the Families of Successful Men (from Table III.)



The upper line of the diagram indicates the successes of direct male ancestors, the lower line those of their brothers. The mean level of the community was inferred from the fact that it cannot be higher than the lowest entries in Table III., so far as these are to be trusted, and that these would be of barely perceptible magnitude in the small diagram.

Relation of Success to Natural Ability.—The success of

a man is wholly due to the combined effect of Natural Gifts and of Circumstances. More, however, being included under the title of natural gifts than can influence success, this part may be disregarded. The remainder comprises intellectual power, appropriate tastes, a persevering disposition, and much else, forming a large group which will be briefly termed "Natural Ability." The Circumstances, so far as they affect success, include healthy rearing, family and social influences, education, money, leisure, and surroundings that encourage work or idleness.

Men whose histories are known can be sorted with rough fairness, and with little difficulty, into three grades of natural ability, one-third of the whole number being classed as "above mediocrity" and marked +1, another third being classed as "mediocre" and marked 0, the remaining third being classed as "below mediocrity" and marked −1. After this has been done and the results recorded, the same men may be sorted afresh and independently into three grades, according to their Circumstances, one-third of them consisting of those whose circumstances conduced to success and are marked +1, the other thirds being respectively marked 0 and −1 on the principle already explained. Assuming for the moment (the question will be discussed later on), first, that Natural Ability and Circumstance are independent, and, secondly, that the mark for Success will always be equal to the sum of those for Ability and Circumstance, then the relation of Success to Ability is easily found. A square table (Table IV.) is made with three columns and three horizontal bands; it consequently contains nine compartments. The "arguments" at the head of the several columns will be +1, 0, −1; so will be those that precede the several bands. Then an entry is made in each compartment equal to the sum of its two arguments. The next step is to sort the successes in order of their values, annexing to each the various grades of ability that have been associated with it, and to enter the averages of them at the side as in Table V.

TABLE IV.—*Distribution of Successes, under the assumption that each differs little from that of the sum of its two variable constituents, and that these vary independently.*

Circumstance	Natural ability		
	+1	0	−1
+1	+2	+1	0
0	+1	0	−1
−1	0	−1	−2

The entries in the body of the table represent the Successes. Each is the sum of its two arguments, which refer respectively to Natural Ability and to Circumstance.

TABLE V.—(*Extracted from Table IV.*)

Grades of success	Associated grades of natural ability			
	All of the observed values			Average values
+2	+1	—	—	+1
+1	0	+1	—	+½
0	−1	0	+1	0
−1	−1	0	—	−½
−2	−1	—	—	−1

The result is that the average quantity of exceptional ability which is associated with any given amount of exceptional success is exactly its half. This same conclusion is reached by an *a priori* argument. Thus, let S, A, C be three independent variables, and $S=\frac{1}{2}(A+C)$. Then if C be unknown, its *average value* will be mediocrity, that is, =0. Consequently S will *on the average* be associated with $\frac{1}{2}(A+0)$, that is, with $\frac{1}{2}A$. There is a uniform rate of regression towards mediocrity. The same will take place if the cases are sorted in such proportions that the mediocrities shall be twice as numerous as either of the extreme groups. The table will then have four columns and four bands, with the arguments +1, 0, 0, −1, and it will have sixteen compartments. The result will still be the same if the mediocrities should be thrice as numerous as either of the extreme groups, and so on.

The two assumptions that have been made with the purpose of giving a rough idea of what would really occur must now be justified so far as may be. The first assumption was that natural ability and circumstance may be treated as *independent* variables. This position would be indefensible if we were making a precise analysis, because the two are certainly correlated to some extent. Thus a bright attractive boy receives more favour, and thereby has more opportunities of getting on in life, than a dull and unpleasing one, but these advantages are not unmixed with drawbacks; attractiveness leads to social distractions, such as have ruined many promising careers. The amusing couplet of Henry Taylor is worth quoting:—"Me, God's mercy spared, from social snares with ease Saved by the gracious gift, ineptitude to please." Another instance of correlation is that the disposition to intellectual effort being heritable, a naturally studious boy is frequently brought up in a family whose influence and opportunities develop his natural bent; similarly as to natural scapegraces. But my returns here and elsewhere show that home influences are much less potent than might be supposed. Many correspondents speak of themselves as the only members of their family who had tastes like their own, and kinsfolk win distinction in many different directions. Moreover, a reaction against the monotony of home influences is often shown by those strong characters whose tastes are not in complete harmony with them. The correlation between natural aptitude and the circumstances favourable to success is consequently less strict than appears at first sight, and to the best of my judgment is not worth regarding in a rough inquiry.

The other assumption was that success is equal to the simple sum of natural ability and favouring circumstance. On the contrary, it must be some highly complex and discontinuous function of it. Still, the fact remains that a gifted child is more likely to succeed under conditions that are on the whole favourable to success than otherwise. The obvious objection that circumstances favourable to the development of one class of mind may be prejudicial to that of another is met by supposing a preliminary grouping of the men according to their dominant tendencies, scientific, scholastic, artistic, devotional, militant, and so forth, and treating these groups separately, each with its appropriate classification of circumstance. Little more is asked for than that natural ability and circumstance, as reasonably interpreted, shall be considered *cumulative*, in a broad and general sense, in their power of leading to success. It follows from this that any "exceptionality" of natural ability will, on the average, be roughly proportional but inferior to the exceptionality of the accompanying success. Also that the two will agree in direction, good ability going with high success, poor ability with the reverse. Rare exceptions do not invalidate general conclusions, any more than the fact of one boy in a class of schoolmates dying very early or very late invalidates the expectation of life at school ages as calculated by actuaries.

Exceptionally Gifted Families.—The diagram would assure us, even if we had no other grounds for assurance, that exceptionally gifted families must exist, whose race is a valuable asset to the nation. A few of these have been indicated by the present returns; they well deserve, and will probably receive, a full description hereafter. It must suffice for the present to mention the existence of at least nine gifted families connected with fellows of the Royal Society, two or three of whom are exceptionally gifted. I will conclude with the remark that the experience gained through this inquiry has strongly confirmed an opinion expressed in my lecture on Eugenics before the Sociological Society, of which an abstract appeared in these columns (vol. lxx. p. 82), namely, that it would be both feasible and advantageous to make a register of gifted families. I have now better hope of being able to carry some such design into effect.

FRANCIS GALTON.

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Nature Not (in Oct.) 1904

Sept 29.

Average Number of Kinsfolk in each Degree.

What is the average number of brothers, sisters, uncles, nephews, nieces, first cousins, &c., that each person possesses? I had occasion to compute this for a particular collection of persons; the results were so far unexpected as to show that the question deserved a consideration which it has not yet received, so far as I am aware. The problem proved easy enough in the end, but not at first, for there are other ways of attacking it, in which I blundered and lost time.

The simplest conditions that will serve for a general theory are those of a supposed population (1) the numbers of which are statistically constant in successive generations; (2) the generations of which do not overlap; and (3) which are "complexed" by having wholly passed into history; and again (4) where every person is taken into account, at whatever age he or she may have died. It will be a further great simplification if it be allowed (5) to suppose the males and females to be equal in number, and in all respects to admit of similar statistical treatment. This need be only a provisional way of looking at the problem, for it will be seen that corrections can easily be introduced if desired.

It will much facilitate matters to begin by dealing exclusively with either the male or the female half of the population, leaving the other half to follow suit. We will begin with the females.

Let d be the average number of female children born of each woman who is a mother, so if there be n mothers in the population the total number of females in the next generation will be nd. How many of these latter will prove fertile of female children? On the supposition of statistical constancy, the number of mothers in the two generations will be the same, therefore d out of the nd will be fertile of female children; conversely, the probability that any one of these female children will herself bear one or more female children $= 1/d$. As a test of this, the average number of fertile daughters to each mother will be $d \times 1/d = 1$, as it should be.

Next, as regards sisterhoods. Each mother bears on the average d female and d male children, or $2d$ individuals in all. Each of these will have $2d-1$ brothers plus sisters, and half that number of sisters, namely, $d-\frac{1}{2}$.

The syllable *si* will be used to express "sisters" without regard to age or fertility, and *si'* to express "sisters who are fertile of female children"; similarly *da* and *da'* for daughters.

The number therefore of *si* is $d-\frac{1}{2}$, of *si'* is $\frac{1}{2}(d-\frac{1}{2})d$, of *da* it is d, of *da'* it is 1. The number of *mo'*, or of mothers to a child, is, of course, 1, and there is no occasion for using *mo*, as a mother must be fertile.

A few examples of results are given in the following table; it could have been extended indefinitely, but these are quite sufficient for drawing conclusions:—

Specific kinships.		Average number in each	
Ancestry—			
mo'	(mother)	1	1
mo' mo'	(mother's mother)	1×1	1
mo' mo' mo'		$1 \times 1 \times 1$	1
Collaterals—			
si	(sisters)	$(d-\frac{1}{2})$	$d-\frac{1}{2}$
mo' si	(mother's sisters)	$1 \times (d-\frac{1}{2})$	$d-\frac{1}{2}$
mo' mo' si		$1 \times 1 \times (d-\frac{1}{2})$	$d-\frac{1}{2}$
si' da	(sister's daughters)	$(d-\frac{1}{2})\frac{1}{2}d \times d$	$d-\frac{1}{2}$
mo' si' da		$1 \times (d-\frac{1}{2})\frac{1}{2}d \times d$	$d-\frac{1}{2}$
si' da' da		$(d-\frac{1}{2}) \times 1 \times 1/d$	$d-\frac{1}{2}$
Descendants—			
da	(daughters)	d	d
da' da	(daughter's daughters)	$1 \times d$	d
da' da' da		$1 \times 1 \times d$	d

The above remarks and table are equally applicable to males if *bro* (or brother) is substituted for *si*, *son* for *da*, *fa* (or father) for *mo*.

It will, then, be understood that each mother, or fertile couple has, on the average, d sons and d daughters, or $2d$ children altogether, of whom 1 is a fertile son, 1 a fertile daughter, and that the others die without issue. In the collected mentioned above, the value of d was about $2\frac{1}{2}$, that is to say, an average family consisted of about 5 children.

It is unnecessary to prolong these remarks by considering the minor corrections to be supplied on account of the hypotheses not being strictly accordant with observation. The two most important of these relate to populations that are not stationary, and to the allowance to be made for inequality in number of the sexes. There are others hardly worth even the trouble of describing, being utterly insensible in rough work.

The general results are that kinships fall into three distinct groups:—(1) direct ancestry, (2) collaterals of all kinds, (3) direct descendants, and that the number of individuals in each *specific* kinship in these classes is respectively 1, $d-\frac{1}{2}$, and d. Also that $d=2\frac{1}{2}$ may be accepted as a reasonable and not infrequent value. To determine the number of individuals in each *general* kinship, the appropriate tabular number must be multiplied by the number of *species* that the group contains; thus there are two species of aunts, *mo si* and *fa si* (mother's sisters and father's sisters), each of which has the tabular number of $d-\frac{1}{2}$; therefore the average number of aunts is $2d-1$, which, in the above case of $d=5$, is equal to 4.

Francis Galton.

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Nature
Nov 1904 10/11

Duplicate

Average Number of Kinsfolk in each Degree.

I WAS glad to read the first paragraph of the reply by Prof. G. H. Bryan to my letter, in which he acknowledges his mistake, but I cannot allow the second paragraph to pass without protest, in which he says "the discrepancy can be accounted for more simply still" in a way he describes. I do not wholly understand his present view, but only enough of it to be assured that it is vitiated by some fundamental misconception. In these circumstances it is best to re-state my original argument in different words. We agree to start on the assumptions that boys and girls are on the average equally numerous, and that all other conditions are to be ignored. Then, if an individual be taken out of a family of $2d$ children, $2d-1$ children will be left, of whom $d-\frac{1}{2}$ will, *on the average of many experiences*, be girls and $d-\frac{1}{2}$ will be boys. The sex of the individual who was taken out in the first instance is quite unimportant; the result will be the same whether that individual be a boy or a girl.

Prof. G. H. Bryan thinks, if I understand him rightly, that the sex of the individual in question *is* of importance.

Some persecuting demon must have again caused my pen to write and my eye to overlook an absurdly erroneous figure in my last letter. The faulty passage runs "... is 80 ($=2\frac{1}{2}\times 16$, as it should be)"; the 16 ought to be replaced by 32. It is intended to be quoted from the right hand column of line (5) in the table which accompanies that letter.

FRANCIS GALTON.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Average Number of Kinsfolk in Each Degree.

MAY I ask you to insert yet another brief communication on the above subject, because private correspondence shows that paradoxical opinions are not yet wholly dispelled? The clearest way of expressing statistical problems is the familiar method of black and white balls, which I will now adopt.

Plunge both hands into a dark bag partly filled with black and white balls, equal in number, and well mixed. Grasp a handful in the right hand, to represent a family of boys and girls. Out of this unseen handful extract one ball, still unseen, with the left hand. There will be *on the average* of many similar experiments, as many white as black balls, *both* in the original and in the residual handful, because the extracted ball will be as often white as black. Using my previous notation, let the number of balls in the original handful be $2d$. Consequently the number in the residual handful will be $2d-1$, and the average number in it either of white or of black balls will be half as many, or $d-\frac{1}{2}$. It makes no difference to the average result whether the hitherto unseen ball in the left hand proves to be white or black. In other words, it makes no difference in the estimate of the average number of sisters or of brothers whether the individual from whom they are reckoned be a boy or a girl; it is in both cases $d-\frac{1}{2}$. The reckoning may proceed from one member of each family taken at random, or from all its members taken in turn; the resultant average comes out the same.

This, briefly, is my problem. FRANCIS GALTON.

should be reserved for the recitation-room," and not given in the laboratory. Still less would they say that the students should "study thoroughly all the details of an experiment before attempting to perform it," and that "this should be done outside the laboratory." Whether such a system would tend to produce a hodman or an architect would depend, as it seems to the writer, less upon its own merits than upon the personality of the instructor.

C. S.

Die Einheit der Naturkrafte in der Thermodynamik. By Richard Wegner. Pp. viii + 132. (Leipzig: Von Veit and Co., 1904.)

and in treatment that few points of resemblance may be found between them.

In the book by Lieut.-Colonel Ariès the mathematical derivation of the laws of equilibrium from the fundamental principles of thermodynamics are stated in the most abstract and general form with just sufficient exemplification to indicate the bearing of the deductions on the practical work of physical chemistry. The author uses as characteristic function the thermodynamic potential at constant pressure, and it may be said in a word that his deductions are as simple and concise as the case will allow, the introduction of useless conceptions and formulæ being scrupulously avoided. One noteworthy feature which might with advantage be imitated in other works on thermodynamics applied to chemistry is the postponement of the discussion of the perfect gas to a point in the last third of the volume. The student is only too apt in dealing with the involved formulæ of certain cases of chemical equilibrium to introduce unconsciously into his equations some result which has its origin in a consideration of perfect gases, thereby obtaining a simple result apparently general, but in reality not so.

HEREDITY AND ENVIRONMENT.

TO THE EDITOR OF THE TIMES.

Sir,—In your issue of May 24 an important article appears under the above heading, in which the following words occur :—

> The biometricians in particular are curiously one-sided. They take ability or insanity, for instance, and show how often it is inherited. Very well; but before drawing any conclusions it is necessary to examine the cases in which it is not inherited. Sometimes it appears *de novo* in a family, and sometimes, also, having appeared it is not transmitted to offspring. A really scientific inquiry would take as much account of those cases in which heredity fails as of those in which it succeeds.

As far as I am aware the biometric determinations of the intensity of heredity in the cases of ability and insanity are based on the following researches :—

(i.) Pearson: Huxley Memorial Lecture, 1903, "The Inheritance of the Mental and Moral Characters in Man." The material was a random sample of the school population, no selection was made of able stocks.

(ii.) Pearson: Family Records—500 family histories. The collection was made without any selection of the intellectual ability of members, and forms a fairly average sample of middle-class families.

(iii.) Schuster: "The Inheritance of Ability." The *data* were taken from the records of Oxford, Harrow, and Charterhouse, without any selection with regard to ability within those records.

(iv.) Heron: "The Inheritance of the Insane Diathesis." The major portion of this memoir is occupied with the determination and discussion of the cases in which non-insane have insane or non-insane offspring. The conclusions reached are based on careful consideration of the very points your correspondent suggests biometricians invariably neglect.

(v.) Goring: "The Inheritance of the Diatheses of Phthisis and Insanity." Precisely the same caution is observed as that recorded in (iv.)—namely, including the insane who spring from non-insane parentages and the non-insane who spring from non-insane parentages.

I am in the face of these facts wholly at a loss to understand your writer's sweeping statement with regard to the biometric school. He has either not studied their published works, or is basing his conclusions on the perfectly idle criticisms of biometric work which are scattered broadcast by those who have attached themselves to more fashionable methods of investigation, and believe that to disparage what they do not take the trouble to study is an easy way to dispose of inconvenient facts.

I am, Sir, &c.,

KARL PEARSON.

Biometric Laboratory, University College, W.C.,
May 27. 1903

JUNE 9.—ORATORIO SERVICES at the CATHEDRAL, at 2.15 and 7.15. Agnes Nicholls, Carmen Hill, Phyllis Lett, Gervase Elwes, Francis Harford. London Symphony Orchestra and Chorus of 500. Conductors, SIR E. ELGAR, SIR A. C. MACKENZIE, Dr. WALFORD DAVIES, Mr. GRANVILLE BANTOCK, Dr. G. J. BENNETT.

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LECTURES.

ROYAL SOCIETY of ARTS,
John-street, Adelphi, London, W.C.

Wednesday, June 1, at 8 p.m.
ORDINARY MEETING.—"The Restoration and Discoveries at the Guildhall, London." By SYDNEY PERKS, F.R.I.B.A., F.S.A. Dr. PHILIP NORMAN, F.S.A., will preside. (The paper will be fully illustrated with lantern slides.)
H. TRUEMAN WOOD, Secretary.

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F. 2r

LORD NORTHBROOK AND THE BARINGS.

Times 1904

TO THE EDITOR OF THE TIMES.

Sir,—Your very interesting account of Lord Northbrook deserves to be supplemented, because his family, that of the Barings, is conspicuous for its administrative and other ability. This was impressed upon me during the course of a recent inquiry into the "Achievements of near kinsfolk of some of the Fellows of the Royal Society," of whom Lord Northbrook was one. For that purpose I sent a circular with a blank schedule to all the Fellows, and received answers from one-half of them, including Lord Northbrook. The results are printed in the little pamphlet that I enclose, which is only nominally "published," being really printed for circulation among past or future contributors to my inquiries. Unfortunately the revision of the MS. by Lord Northbrook of the Baring family reached me just too late for insertion in the pamphlet, although he took much interest in the inquiry, as may be gathered from the concluding words of the letter that accompanied his revision :—"If I can be of any further use to you, pray let me know. If you put the story into print, I shall be happy to correct the proof." I now send to you a revised copy of the MS. that he returned. The abbreviations are easily intelligible. "Fa," "mo" "bro," "si," "son," stand for father, mother, brother, sister, son, respectively. Example—"mo fa bro Grey 1st Earl," means that Lord Northbrook's mother's father's brother was Grey first earl :—

Northbrook, 1st Earl of, Thomas George Baring (1826-1904), P.C., F.R.S. (son of 1st Baron Northbrook) ; Under-Secretary of State for India, Home Department, and War ; Viceroy of India, 1872-76 ; First Lord of the Admiralty, 1880-85—("Who's Who").

Fa fa fa, Sir Thomas Baring (1710-1810), founder of Baring Brothers and Co., chairman East India Company, 1792-3, cr. baronet, 1793—(Dict. Nat. Biog. 3 192).

Fa fa bro, Ashburton, 1st Baron, Alexander Baring (1774-1848), financier and statesman ; head for many years of Baring Brothers and Co., member of Sir R. Peel's Cabinet, 1835, raised to peerage, 1835, Commissioner to U.S., 1842, for settlement of boundary dispute ("Ashburton Treaty")—(Dict. Nat. Biog. 3 190).

Mo mo, Hon. Lady Grey, *née* Whitbread (1770-1853), "Prominent in every work of Christian philanthropy" during 24 years in the Commissioner's house (her husband's) at Plymouth, afterwards in Ireland—(*Record* Newspaper, May 28, 1853).

Fa, Northbrook, 1st Baron, Francis Thornhill Baring (1796-1866), double first at Oxford, First Lord of the Admiralty—(Dict. Nat. Biog. 3 193).

Fa bro, Thomas Baring (1799-1873), financier (refused Chancellorship of the Exchequer, also a peerage), head for many years of Baring Brothers and Co.—(Dict. Nat. Biog. 3 193. See also Disraeli's life of Lord George Bentinck, pp. 87-423 and 463).

Fa bro, Charles Baring (1807-1879), double first at Oxford, Bishop of Gloucester and Bristol, then of Durham.

Fa fa bro son, Cromer, 1st Earl, Evelyn Baring (b. 1841), P.C. (son of H. Baring, M.P.), passed first into Staff College from Royal Artillery. Services in Egypt, for which he was made successively baron, viscount, and earl —("Who's Who")

Fa fa si son, Taunton, 1st Baron, Henry Labouchere (1798-1869), first class *Lit. Hum.* at Oxford, Cabinet Minister under Lord Melbourne and Lord John Russell, cr. peer, 1859—(Dict. Nat. Biog. 31 367).

Mo fa bro, Grey, 2nd Earl, Charles Grey (1764-1845), Prime Minister, carried the Reform Bill—(Dict. Nat. Biog. 23 173).

Mo si son, Edward Jenkinson, K.C.B., private sec. to Lord Spencer when Lord Lieutenant of Ireland ; distinguished services as head of secret police—("Who's Who" and private information).

Descended from fa fa fa bro, Rev. S. Baring-Gould (b. 1834), author of numerous works, theological, poetical, historical, and novels—("Who's Who").

It was my fortune to serve on a council that met frequently during two years, over which Lord Northbrook presided, and I am glad of this opportunity of bearing testimony to his remarkable ability in that office. By the use of happy phrases that clearly summed up what had been said, he had the faculty of preventing useless iteration and verbiage, with the result that after a brief sitting every member of the council felt that all had been said and fairly put that he wished to have been considered. I was informed that this rare combination of thoroughness with quickness was a characteristic of the Baring family. I should greatly have valued Lord Northbrook's views on this particular point, but that opportunity is now gone for ever.

FRANCIS GALTON.

THE KNIGHT OF THE BURNING PESTLE.—"The revival is a thing to be seen, and none need stand aloof. The play has no offence in it, and any schoolmistress may take her girls."—ROYALTY.

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THE WALLS OF JERICHO.
By Alfred Sutro.

The cast also includes Mr. Sydney Valentine, Mr. O. B. Clarence, Mr. H. Nye Chart, Miss Kate Serjeantson, Miss Muriel Beaumont, Miss Elfrida Clement.
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Box-office open 10 to 10. Boxes, 1½ to 5 guineas. Stalls, 10s. 6d.; balcony, 7s. 6d.; upper circle (front row), 5s.; other rows, 4s.

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NOTICE.—LAST FIVE WEEKS of the appearance of Miss ELEANOR ROBSON in MERELY MARY ANN, in consequence of her having to fulfil engagements previously made to appear in this character in America. Seats now on sale from 10 to 10.

IMPERIAL THEATRE.—MR. LEWIS WALLER.
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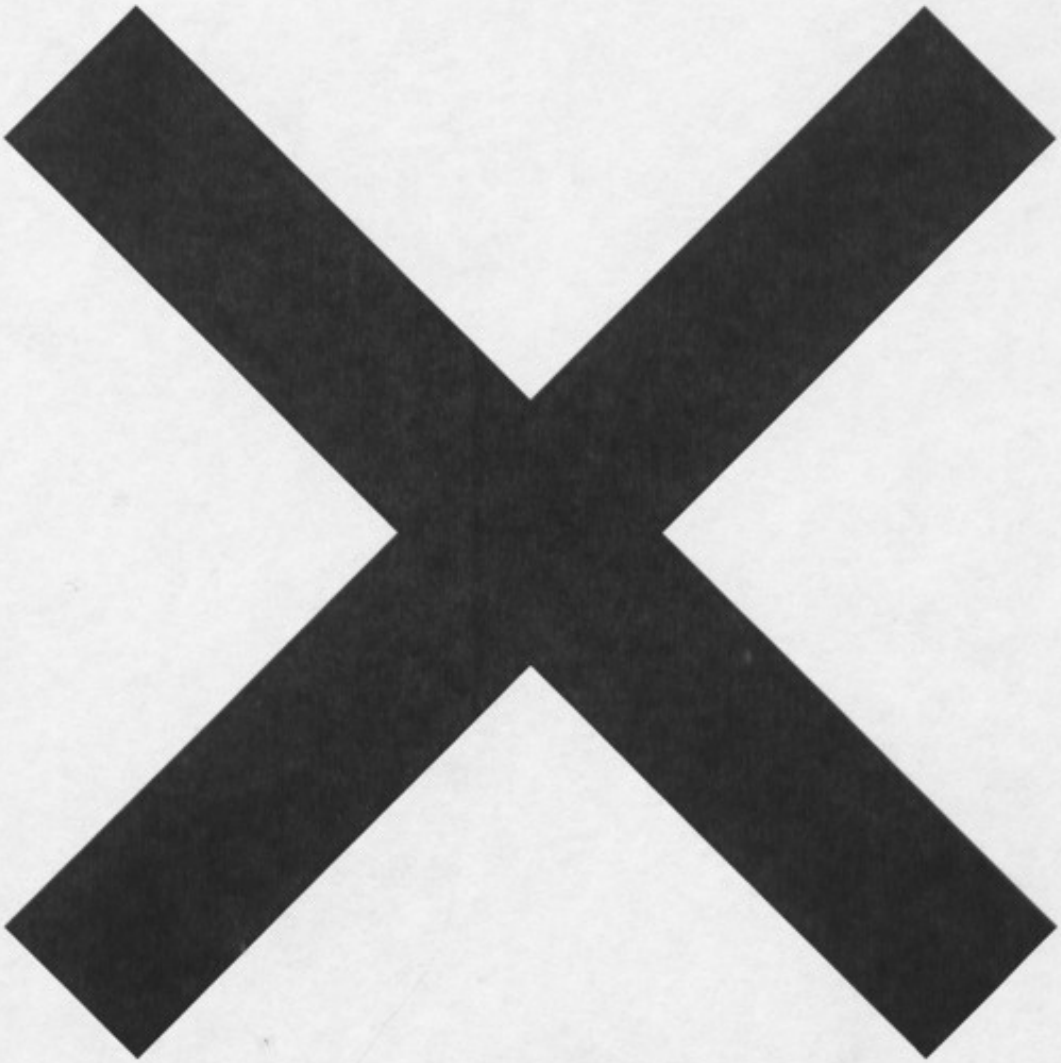

... by National Eugenics, a prominent place must be assigned to an examination, by Mr. David Heron, Galton Research Fellow, into the influence of defective physique and unfavourable home environment on the intelligence of school children. This research was based upon the London County Council present school survey, in itself a praiseworthy endeavour on the part of Dr. Kerr, the Council School Medical Officer, to carry out, upon the small scale within his power, an investigation which he had recommended upon a larger one, but which the Council decided to postpone. Dr. Kerr succeeded in obtaining the desired data from fourteen schools in different parts of London and attended by children of different types and circumstances; and Mr. Heron has examined the results, so far as twelve of the schools are concerned, by the methods of modern statistics. It is to be regretted, although it is perhaps inevitable, that these methods do not readily lend themselves to statements of an untechnical character, or lead to the expression in lucid and easily remembered phrasing of conclusions by which the attitude of the public mind towards the questions at issue might be modified or determined. Mr. Heron assumes, in relation to the facts, a larger influence of heredity than many persons would, we think, be prepared to concede; for he asserts that, even in the metropolis, it is quite easy to find significant race differences in different districts, and that stature and weight are as markedly differentiated among these racial types as are hair colour, eye colour, or shape of head. He further declares that the eyesight, hearing, and standard of clothing of such types are similarly differentiated; and that no study of the physique of the school children will be of service unless it be associated with some determination of the racial elements in the schools under consideration. No instructed student of anthropometry, he assures us, attributes the indicated differences to the effects of environment, but "knows well" that they are due to different racial proportions in the different districts. If this be so, how are we to explain the fact, which is surely within everybody's experience, that children presenting marked differences of colouration, of eyesight, and of other physical characters are constantly to be found in the same family, among the offspring of the same parents? Assuming, as is probably the fact, that such instances are examples of the preponderance of one element of ancestry in one child, and of another element in another, they surely point to an uncertainty in inheritance which must render it supremely difficult to determine the precise value which, in any particular case, should be assigned to such a character as stature or colouring. If there be nothing certain about the unit of the calculation, there can be nothing certain about the sum. Such difficulties as these will afford an abundance of work for future investigators; and in the meanwhile Mr. Heron formulates the conclusion that, so far as the particular investigation extends, there is "no sign of an environmental "condition producing an effect on the "normality of the child at all comparable to the "known influence of heredity." So far, therefore, the views of the eugenic philosophers concerning the importance of selection in marriage would appear to be confirmed; but it must not be assumed that they have penetrated beyond the threshold of the inquiry.

IRELAND.

PUNCHESTOWN RACES.

DUBLIN, April 23.

The first day of the Punchestown Race Meeting inaugurates a week which, with the exception of Horse Show week, is the most brilliant of the social year in Dublin. Unfortunately Punchestown is not lucky in the weather, and to-day's enjoyment was marred by heavy rain. [illegible]

[illegible]

ROYAL DUBLIN SOCIETY'S SHOW.

[illegible]

"PARNELLISM AND CRIME."

[illegible]

Per S. Galton

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From **THE TIMES,**
Printing House Square, E.C.

21 5 1910

The Children of the Alcoholic.

We publish in another column a summary of a report on the children of alcoholic parents, prepared by Miss Ethel Elderton, Galton Research Scholar, with the assistance of Professor Karl Pearson; and the conclusions which it formulates are likely to excite something like consternation among a large number of the enthusiastic advocates of what they are pleased to call "temperance," however little of that truly admirable quality may be discoverable in the speech or writing of its professors. It has for many years been one of the recognized contentions of teetotalers to declare that parental alcoholism is eminently injurious to offspring; and although physiologists have long been doubtful of the power of an extraneous agency to modify the germ plasm in the manner asserted, there can be no doubt that a belief to this effect has sunk deeply into the public mind, and would hardly be questioned upon a platform. Whatever else was believed or disbelieved about the effect of "drink," few would be bold enough to deny that the children of drunkards are likely, on the whole, to be "degenerates" or the inheritors of physical and intellectual defects calculated to interfere with their eventual usefulness as adult members of the community. The opposite view, so far as we remember, has only been maintained on the basis of statistics furnished by experience of the children received into Dr. Barnardo's Homes, children among whom the proportion of drunkenness among the parents would certainly be large, and would probably be only limited by lack of opportunity; while something like 90 per cent. of the children have been found to be convertible into healthy, industrious, and self-respecting members of society. It is highly interesting to find that the detailed examinations conducted by Miss Elderton afford no support to the doctrine that the children of alcoholic parents enter upon life under any inherent disadvantages; and that, in the case of more than three thousand children examined in Edinburgh and in Manchester, among whom, according to the tables appended to the report, nearly one-half were the offspring of a drunken parent or parents, those in whom this condition was fulfilled were certainly not in any way inferior to the children of teetotalers or of the sober. On the grave question whether the children of alcoholics may inherit a tendency to become alcoholics themselves when adult age is reached, the report sets forth no conclusion; but we are informed that it has not been omitted from consideration, and that evidence bearing upon it is in course of being collected.

It is not difficult, in reading between the lines of the report, to see that Miss Elderton and Professor Pearson themselves were hardly prepared for the conclusions at which, nevertheless, they have been compelled to arrive; and they rather emphasize their position in this report by calling attention to the general unwillingness of social reformers to ascertain facts before they express opinions. [illegible]

[illegible]

I may forward your readers to see the "Explanation and Casting of Protestants" from the preface to the Bible "Douay Version," which is a part of the Canon Law of the Church of Rome. I fear many Protestants are ignorant of this important document.

I subjoin, in parallel columns, for the convenience of my readers, a contrast.

A CONTRAST.

The Protestant King's Declaration.	The Roman Pontifical Oath of Abjuration and Obedience.
"I, George, do solemnly and sincerely, in the presence of God, profess, testify, and declare that I do, and that I shall, maintain the Limitations of the Crown and the Succession of the Crown in the Heirs of the Body and Descendants, being Protestants, of the Princess Sophia, Electress and Duchess Dowager of Hanover, as they stand limited by the Act of Parliament, and that I do and shall maintain the Protestant Reformed Religion established by law. And I do solemnly, in the presence of God, profess, testify, and declare, that I do make this Declaration and every part thereof in the plain and ordinary sense of the words of this Oath, without any evasion, equivocation, or mental reservation whatsoever, and without any dispensation already granted for this purpose by the Pope, or any other authority or person whatsoever, or without thinking that I am, or can be, acquitted before God or man, or absolved of this Declaration or any part thereof, although the Pope, or any other person or persons or power whatsoever should dispense with or annul the same, or declare that it was null and void from the beginning."	"I, ——, from this hour henceforward, will be faithful and obedient to Saint Peter, the Holy Apostolic Church of Rome, and to our Lord, the Lord Pope ——, his successor canonically entering. Moreover, I will assist them to preserve, defend, increase, and promote the Papacy, and the rights, honours, privileges, and authority of the said Lord and his successors aforesaid. I will not be present at, consent to, or give counsel, consent, or assistance to any plots or attempts whatsoever, made against the said Lord and successors aforesaid, or against the Papacy, by any persons whatsoever, or if I shall know of any such to be plotted or attempted, I will oppose the same to my utmost power, and will as soon as possible make it known to the said Lord or his successors aforesaid. The rights of the Papacy, which I shall endeavour to defend against everyone, I will preserve, increase, and promote to the utmost of my power, for the said Lord and his successors aforesaid. Heretics, schismatics, and rebels to the said Lord and successors aforesaid, or to the Papacy, in all commands given me by the said Lord or his successors aforesaid, I will persecute and oppose to the utmost of my power, and will wage war against them. I will come to the Council when called by our Lord or his successors aforesaid, unless hindered by canonical impediment, or by some one of the brethren of the Holy Church, or by the command of the said Lord himself. I will visit the Apostolic See every three years, and will render an account to the Pope of all my episcopate, and of all things appertaining to the state of my diocese, the cure of souls, and especially the faith of the Holy Church, and will humbly ask for the apostolic benediction. All possessions of the Holy Roman Church which shall be entrusted to me for the purpose of administration I will endeavour not to alienate, even with the consent of the Holy See, unless I shall have given previous notice thereof to the said Lord Pope. And if I shall alienate any portion thereof, I will incur, ipso facto, the penalty contained in a certain decree published concerning this matter. I will not bind myself by oath to any other person, secular or regular, without the special permission of my said Lord Pope or his successors aforesaid. So help me God, and these Holy Gospels of God."

The Protestant Declaration condemns certain doctrines held by all his Majesty's Roman Catholic subjects. The Pope's Bull excommunicates and denies, on the part of the Prince Aforesaid, the princes of all his Majesty's Protestant subjects, and of the King himself.

How can you, Mr. Editor, say—the language of the King's Declaration "is offensive to the religious feelings of his Majesty's Roman catholic subjects," is not the language of "the Pope's Bull "Regnans Deridet" equally offensive to the religious feelings of his Majesty's Protestant subjects?

"We Protestants give Romanists liberty to express in their own terms or words the faith which they conscientiously hold. Do Romanists refuse to us Protestants a similar liberty, to express in our own terms or words the faith which we conscientiously hold? And, can Protestant King in the "Declaration" merely express his faith in the terms of words of the Church of England, of which his Majesty is not only a member but also the head—as the Pope is of the Roman Church.

In conclusion let me say that the words described as "offensive" are the very words which make it impossible for a Romanist to make the "Declaration." The authorities of the Roman Church know this full well, though doubtless many private Romanists—and most Protestants—are not aware of the fact.

I am, Sir, your obedient servant,

ROBERT FOLK.

Hampstead, N.W., May 24.

ELECTION INTELLIGENCE.

SUSSEX (LEWES DIVISION).

The death of Sir Henry Aubrey-Fletcher, which is recorded in another column, creates a vacancy in the Lewes Division of Sussex. After his election in 1885 by a majority of 1,132 over Mr. W. E. Gladstone, the Liberal candidate, Sir Henry Aubrey-Fletcher was returned unopposed in 1886, 1892, and 1895. The figures of the contested elections were:—

1885.		1885.	
Sir H. Aubrey-Fletcher	3,966	Sir H. Aubrey-Fletcher	3,966
Mr. W. Pitt-Lewis	2,834	Mr. W. Pitt-Lewis	2,834
Unionist majority	1,132	Unionist majority	1,132

1892.	
Sir H. Aubrey-Fletcher (L.)	3,930
Mr. Basil Williams (L.)	1,971
Unionist majority	1,959

Soon after the last election Sir Henry Aubrey-Fletcher announced that he would not seek re-election owing to ill-health, and on April 6 at a meeting in Brighton, Mr. W. R. Compton was selected as prospective Unionist candidate. Mr. Compton is a son of Colonel Compton, C.B., of Danny Park, Sussex, a cousin later Mr. Basil Williams, who contested the seat in January, announced that he had accepted an invitation to stand again in the Liberal interest.

The total electorate numbers 11,911.

ATTEMPTED ASSAULTED MURDER.—Shortly

after 4 o'clock yesterday morning the police were called to a house in Middlesex-street, Aldgate Pass, where Mr. Alfred Mr. Arthur Maynard Harding previously was wounded in the throat. Her husband, Alfred Harding, a costermonger, was present, and there is no evidence that a terrible struggle had taken place. Mr. Maynard was taken to the London Hospital, Whitechapel-road, where it was found that he had several cuts in the throat. The husband is now in custody on a charge of attempted murder, and will be brought up at Clerkenwell Police-Court to-day.

[illegible] a law distinctly attached to the action, and the consequences would follow according to the nature of transactions law.

The next Bill or not prescribe the wording of the Declaration, of Catholic doctrine, commonly called "the Declaration" which must be clearly distinguished from the Coronation Oath, but it at all be penalty whatever to the omission of it.

If, in addition a matter of grave constitutional whether, if any Sovereign of his or her own Royal will and pleasure omitted it, he or she would be free subjects not be excluded from the Throne or the people of the Kingdom be absolved from their allegiance. Were the Scotch to say "Nothing shall induce me to omit these words," I presume they no penalty whatsoever would be incurred.

I am, Sir, your obedient servant,

Windsor, May 26. ERASTUS.

P.S.—May I beg you to allow me to deal with a (hitherto) different point in this discussion in a postscript? One of your correspondents has brought forward the old argument that if the Church of Rome ceases Protestants, Protestants ought to cease, or at least may lawfully cease, Catholics. The old old reply is constituted for the thousandth time and more. The logic seems perfect, no doubt, to your correspondent, who cites 120 sentences of the Council of Trent and says every Catholic is responsible for them. The truth is that confessor of does not mean a curse in the sense of imprecation or any individual. Has your correspondent never read the Pontifical Epistles and found that the greatest Apostle differs two distinct anathemas? (Gal. i., 8, 9.) (Rom. xvi., 17). In another passage he says Alpheus (the very modern view (Rom. ix., 3). St. Paul certainly never wished either himself or any one else to be cursed in the sense of eternally lost. Anathema and Anathema sense according act apart or act of the (a) to temple; (b) hatred, excommunication, curse in a forcible expression of rejection, and in the sense of a thing hateful to peculiar devotion consecrated a curse. But it does not mean eternal damnation, for of such things none is for the judge.

TO THE EDITOR OF THE TIMES.

SIR,—There is a wide gulf on many points between the contributors of Cassandra and those of Mr. Bull [illegible], but when, as the representative of one of the Irish Roman Catholic constituencies, he pleads for the modification of the "Royal Declaration," I venture to think that he should have the assurance

From Times Duplicate

30 5 1910

HEREDITY AND TRADITION.

TO THE EDITOR OF THE TIMES.

Sir,—In the valuable and timely leader in *The Times* of May 12 on "Omens and Portents" it is stated that "the latest hypotheses of heredity would seem to be not inconsistent with the survival throughout civilization of some of the most primitive instincts, beliefs, and superstitions of primeval and primordial man. Such survivals may, for the most part, be buried deep down in the unconscious recesses of our being."

As to the survival of such instincts, beliefs, and superstitions there can be no doubt. And it may be that there are hypotheses of heredity which would justify the supposition that such survivals are buried deep down in the unconscious recesses of our being. There are hypotheses of organic heredity which are reasonable, well based, and generally admitted, and there are others which are wild and fantastic.

Without questioning further the justice of the statement in the precise terms quoted above, I think it desirable to point out that there is a tendency among those who are interested in the history of the human mind to confuse the results of two very distinct processes under the names "heredity," "inheritance," and "transmission to heirs." The one process is the handing on to an heir by a human being of external property, things made or acquired by the testator and bequeathed to his heirs. This is the original signification of the words. Secondarily, they have been applied to another and distinct process—viz., the transmission, owing to the organic continuity of the actual substance of the offspring with that of its parents and remoter ancestry, of qualities present in the living material of those parents and that ancestry. The two processes are totally different in nature from one another, but are spoken of by the same terms without qualification and frequently with seriously misleading result. There is no reason to suppose that any structural condition of the brain corresponding to specific knowledge or belief can be handed on from generation to generation by organic continuity—that is to say, by the reproductive particles—whatever fancies and suggestions of a contrary tendency may have been indulged in by those who prefer mere speculation to scientific method.

"Educability" (concerning which I would refer to my article in *Nature*, Vol. LXI., p. 629)—the power of acquiring knowledge, of receiving from the gesture, habits, voice, or documents of existing humanity the traditions and beliefs of past generations—is, on the contrary, transmitted in varying amount from parent to offspring by organic continuity. But the knowledge, tradition, or belief has to be learnt afresh by each succeeding generation. It is only when this fact is fully realized that we perceive the enormous importance of that Record of the Past which is the distinctive possession of man, as contrasted with his animal predecessors and contemporaries. Man is born to a real inheritance in the primary signification of the word, an extra-corporeal or secreted, fabricated envelopment of taboos, traditions, customs, beliefs, laws, and eventually of accumulated records of experience, which is not evanescent but to an astonishing degree persistent from its earliest beginnings even to our own period. Its enormous volume is increased in every generation. It began among animals with the tendency of the younger generations to imitate their parents, took shape in the taboos and customs of primitive man, and at the present day ranges from the precepts and folklore of the nursery to the laws of the State and the publications of scientific societies. It is "deep down in the unconscious recesses" of this tremendous extra-corporeal inheritance and not in the protoplasm of the egg-cell and the sperm-cell that we must seek for the origins of omens and portents. One or another class or race or individual among living men may be more or less receptive of one or another part of the huge heritage of tradition; and at times of stress and emotion the impression produced when the tradition was first communicated in childhood and unconsciously retained ever since may become dominant. But the inheritance has been received as the result of individual "education," and is not inherent, is not part of that corporeal protoplasmic heredity of which all organisms are capable. It is part of the great Record of Speech possessed by man alone.

It is, I submit, hardly possible to imagine a mechanism by which the reproductive germ-cells could carry from one generation to another the extremely complicated and precise structural conditions which are the material correlatives of what we call "a definite belief" or of what we call "specific knowledge." Even were human ingenuity capable of conceiving of such a mechanism, there are, I venture to assert, no facts known which call for the effort any more than there are facts ascertained which render it necessary to imagine a mechanism by which the thought of one brain can be transmitted through space to another brain without the stimulation of one or other of the organs of sense in the recipient and the subsequent interpretation of that stimulation by an established code.

Yours faithfully,

E. RAY LANKESTER.

29, Thurloe-place, S.W.

QUEEN'S THEATRE. Mr. H. B. IRVING.

UNANIMOUS VERDICT OF THE SUNDAY PRESS on

"JUDGE NOT—" and ROBERT MACAIRE.

THE OBSERVER.

[illegible]

THE SUNDAY TIMES

"It's a wonderful play . . . [illegible]

THE REFEREE.

"The audience followed the play with breathless interest from first to last, [illegible]

THE WEEKLY DISPATCH.

"The performance was given with a [illegible]

"There was a big reception for Mr. Irving, and he thoroughly deserved it."

THE WEEKLY TIMES AND ECHO.

"'Judge Not—' [illegible] It was a superb piece of acting and was very heartily enjoyed."

THE PEOPLE.

"Mr Irving makes of the character a very strong and convincing study. . . . In 'Robert Macaire,' Mr. Irving played the name part [illegible]

REYNOLDS'.

"The audience gave the play a big reception. . . . [illegible]

QUEEN'S THEATRE. SHAFTESBURY-AVENUE.

CONCERTS, &c.

QUEEN'S HALL.
Sole Lessees, Chappell and Co. (Ltd.).

SUSAN STRONG

WAGNER CONCERT.
TO-MORROW (Tuesday), at [illegible]
LONDON SYMPHONY ORCHESTRA.
Conductor—HERR ARTHUR

NIKISCH

Revised Programme.

Overture, "Flying Dutchman"	Wagner
Four Songs with Orchestra	Wagner
Overture and Venusberg Music, "Tannhauser"	
Prelude and Liebestod, "Tristan"	Wagner
[illegible]	Wagner
[illegible]	Wagner
[illegible]	Wagner
[illegible]	Wagner

Tickets, [illegible]
Concert Direction E. A. Michell, [illegible], Piccadilly-mansions, W.

ST. JAMES'S HALL.

BALALAIKA ORCHESTRA. June [illegible], at 8.15.

SECOND GRAND CONCERT.
Conductor—[illegible] PRINCE TSCHAGADAEFF
[illegible]
Assisted by Miss ALICE [illegible] and Mr. H. LANE WILSON.
Balalaika Solo—PRINCE TSCHAGADAEFF.
At the Piano—Mr. [illegible] WALLACE-CAMPBELL.
Tickets, [illegible], at Hall, Agents,
And Miss ALICE E. JOSEPH, [illegible], W.

ÆOLIAN HALL.
THIS DAY, AT 3.15.

HERBERT FRYER.

ONLY RECITAL
THIS SEASON.
CHAPPELL'S CONCERT GRAND PIANOFORTE.
Tickets, [illegible]
CHAPPELL'S MUSICAL AGENCY.
Tel. [illegible] Mayfair. [illegible], New Bond-street.

ÆOLIAN HALL.

TOVEY. TWO RECITALS. CASALS.

PIANOFORTE and VIOLONCELLO.
THURSDAY AFTERNOON NEXT, at [illegible]

SONATA, [illegible]	BRAHMS
SUITE, [illegible]	BACH
SONATA, [illegible]	D. F. TOVEY

Mr. Donald Francis Tovey and Señor Pablo Casals.

CASALS. THURSDAY, JUNE 9th, at 3.15. TOVEY.

SONATA, [illegible]	[illegible]
IMPROMPTUS, [illegible]	SCHUMANN
ELEGIAC VARIATIONS	D. F. TOVEY
(In Memory of [illegible])	
SONATA, [illegible]	BRAHMS

Mr. Donald Francis Tovey and Señor Pablo Casals.
Steinway Grand Pianoforte.
Tickets: [illegible] Æolian Hall; all Libraries, and usual agents.

ROYAL ACADEMY OF MUSIC.

Principal—SIR A. C. MACKENZIE, Mus.D., LL.D., D.C.L., F.R.A.M.

STUDENTS' CHAMBER CONCERT.
QUEEN'S HALL.
(Sole Lessees, Messrs. Chappell and Co., Ltd.)
Thursday, 2nd June, [illegible] o'clock.
The Programme will include:—

Quartet, "God is a Spirit" (Woman of Samaria)	Sterndale Bennett
Suite (MS.) for Flute and Pianoforte	[illegible]
	Charles Graham Schofield
Two movements from Concerto in D minor for Pianoforte and Strings	Bach
Allegro and Scherzo from Pianoforte Quintet in E flat	Schumann
Variations from Quartet, [illegible]	[illegible]

Tickets, [illegible]

BECHSTEIN HALL.

GRIMSON Wednesday, June 1st, at 3.15.

Vocalist, Miss
BEATRICE [illegible].

QUARTET. Programme.

Quartet in G, op. 161	Schubert
Songs by [illegible]	
Quintet in E flat, op. 97, for strings	Dvorák

Tickets, [illegible], at the Hall and usual agents.

LINCOLN MUSICAL FESTIVAL, 1910.
JUNE [illegible].—CONCERT, London Symphony Orchestra and [illegible]

Duplicate

From THE TIMES,
Printing House Square, E.C.

31 MAY 10

TO THE EDITOR OF THE TIMES.

Sir,—Sir Ray Lankester's contributions to our knowledge of biology are always welcome; but his letter on this subject (*The Times*, May 30) is less illuminating than usual. Is he not a little too absolute in saying "there is no reason to suppose that any structural condition of the brain corresponding to specific knowledge or belief can be handed on from generation to generation by organic continuity"? That general knowledge and general belief can be so transmitted he does not deny; nor can it be denied that the new-hatched chick and the new-born colt and foal demonstrate, by walking and running within a very short time of birth, that they have a general knowledge of space-relations; and by running, when alarmed, to their respective mothers, that they have a general belief that by so running they can attain protective proximity to those mothers. The accuracy of Sir Ray Lankester's thesis depends on the meanings we attach to "general" and "specific" as applied to knowledge and belief; and these are relative terms. The inborn repulsion that many people and many animals have for snakes is surely accompanied by an inborn belief that snakes are harmful; and this belief is general with respect to snakes; specific with respect to animals.

Sir Ray Lankester's concluding argument that "it is barely possible to imagine a mechanism by which the reproductive germ cells could carry from one generation to another the extremely complicated and precise structural conditions which are the material correlatives of what we call a 'definite belief' or of what we call 'specific knowledge,'" is not very convincing. It seems to imply that it is possible to imagine a mechanism by which these cells can carry from one generation to another the extremely complicated and precise structural conditions of, say, the arm and the leg. It may be possible; but, as far as I know, it has not been done; and the possibility of imagining the one seems to me neither greater nor less than that of imagining the other. The argument is a favourite one with those who, like Sir Ray Lankester, deny the transmission of acquired qualities. They do not appreciate that, if valid, it proves the non-transmission of every quality whatever.

I am, Sir, yours, &c.,

CHAS. MERCIER.

34, Wimpole-street, May 30.

But the comet's tail was incomparably more magnificent, and far exceeded in length my recollections of Donati's and Coggia's Comets in 1858 and 1874 respectively. No trace of colour has been noted. The tail was seen till about 3.30 a.m. Its width was nearly twice as great as on previous nights. On no occasion has there been any curvature in the tail.

May 18.—Long. 9° 38′ W., lat. 38° 54′ N. From 2 a.m. to 5 a.m. I watched the comet's tail. There were many detached clouds, but in the intervals its position was well observed and sketched. The atmosphere was not so clear as yesterday. The notable features were:—1. The tail was very much widened at its root, the upper boundary being now above Algenib, which was seen through the tail, unaffected by it. 2. The brightness was mostly concentrated at the root of the tail. 3. The axis reached a point I was not sure it reached last night—a star a little below Altair which I cannot name until I have access to star maps. 4. The narrowing from root to tip was more marked. 5. The position of the axis among the stars seems to be unchanged. 6. The total length of the visible part of the tail was about 100°. 7. The tail is still quite straight.

These observations are interesting. The widening of the tail each night shows its rapid approach to the earth. Its extent, exceeding 90°, and its unvarying position among the stars in spite of its enormous motion, prove that it is certain to envelop our earth. The tapering towards the tip of the tail instead of widening as most other comets do shows that any widening is in the plane of its orbit and we see it edge on. Shall we be able to detect our presence in the tail? If so, shall we be able to decide how long we are in the tail? (I estimate that it may take three days for us to pass through the tail.)

May 19.—Long. 7° 54′ W., lat. 36° 36′ N. We are in the tail of the comet. To-day the comet's head passes between us and the sun. We might have expected the tail to lag behind. But we are now in it. This morning was clear in the east from 2 a.m. to 2.30 a.m., but no comet's tail was there. The moon set due west at 2 a.m. The sun rose at 5 a.m. From 2.30 to 3 a.m., long before any trace of dawn could appear, we all saw the fairly clear eastern horizon illuminated as if the dawn were coming, only the reddish colour was absent, and the position of this glow was too far south. It certainly was not caused by sun or moon. It was in the position hitherto occupied by the comet. Also the drifting dense black cumulus clouds overhead all had a bright fringe round their edges, as you may see any night when the full moon is shining overhead. The captain, officers, and myself all saw these illuminations, and were all agreed that, without a moon, they could not be seen under ordinary conditions, and must be due to light from the comet's tail. It ought to be [illegible] looking for the comet's tail

ALCOHOLISM AND OFFSPRING.

TO THE EDITOR OF THE TIMES.

Sir,—There is not a little danger lest the report lately issued from the Galton Research Laboratory should, in spite of your timely caution that its conclusions may later on be disproved by inquiry on a larger scale, lead many persons who know nothing of biometrical methods to infer that these same conclusions provide a safe rule of conduct. I am confident that any such inference would be deprecated both by Professor Karl Pearson and Miss Elderton as not what they intended. However, unless warned to the contrary, a man, or woman, with a predisposition to the drinking habit, might, after reading the report, very well say, Here is positive scientific proof that—I quote from your own excellent summary—"the alcoholic are, on the average, equal to the sober in physique and intelligence—possibly even a little superior." Another set of persons, either married or about to marry, might (erroneously) gather from this same report that alcoholism has no detrimental effect on offspring, for "the balance turns as often in favour of the alcoholic as of the non-alcoholic parentage."

A result so contrary to general experience must, as you, Sir, have remarked, have excited something like consternation among the ardent advocates of temperance. To those, however, who are familiar with the methods of eugenic, or, to use Professor Bateson's convenient word, of "genetic," research, the report causes no surprise at all. It simply confirms their belief that, serviceable as biometry is in its proper sphere, it has its limitations, and that a complex problem such as that of the relation of parental alcoholism to offspring is quite beyond its ken. May I state why in a few words?

First, the biometrical method is based on the "law of averages," which again is based on the "theory of probabilities," which again is based on mathematical calculations of a highly abstract order. From this it follows that, in this particular problem, biometric research supplies no practical guide to the individual: for no man can tell whether he is within the average or not, and even if he is prepared to take on the risk for himself, he may and ought to feel that he must not hazard the future of his children be the odds ever so high in their favour. From the very nature of this same method it also follows that its processes cannot be explained in popular terms, any more than we can in popular terms explain what is the precise chance of throwing a given series of double-sixes, or interpret a differential equation. I agree that some of the new technical phraseology used by the biometricians is at first sight rather repelling—notably their "coefficient of correlation"—but this last expression, though difficult to understand, is at all events free from ambiguity, and is far more correct and better chosen than is its associated term "probable error," which the biometricians have had to borrow ready-made from the astronomers.

Secondly, the biometrical method deals only with patent, and not at all with latent, characteristics or qualities. Herein it differs markedly from Mendelism, which, assigning to each its due place, infers the latent characteristics of one generation from their reappearance as patent characteristics in the succeeding generation.

Bearing, then, in mind the foregoing limitations of biometry, it is obvious that the recent report on "Alcoholism and Offspring" cannot form a practical guide of life. It takes note of young children only, and has no regard to the latent potentialities or disposition which, as a direct consequence of paternal self-indulgence, the adult years may disclose. That the children under the observation of the medical inspectors consulted had the appearance of being "healthy" refutes a good deal of the extreme temperance argument, but it does little else.

More. According to the best authorities on the subject, the immediate effect of persistent alcoholism is to weaken the will-power—*i.e.*, the power of self-control. Now, only when it is tempted, tried, and tested in the outside world does the real character of a human being show itself. But no serious temptation, trial, or test could have been experienced by the 3,000 and more children in Edinburgh and Manchester, the condition of whose parents has been so carefully tabulated in the report; for the one set of children were attending the elementary schools and the other set the "special school for defectives."

Further, the report tells us, and could tell us, nothing of the effect of parental alcoholism on—(a) the volume of infant mortality; (b) the filtration of alcohol through the placental organ; (c) the not infrequent inability of the mother, by reason of alcoholic caress, to suckle her own infant; (d) of the risk that, if she does so, that infant may imbibe alcohol in her mother's milk and die before school life begins. On these points no statistics were obtained, because from the nature of things they were unobtainable.

Such are some of the gaps in the field of biometry when the attempt is made to extend it beyond its legitimate limits. I could name others, but must conclude this letter, already, I fear, over long. I will only, Sir, add, with your permission, that the Eugenics Education Society has for some time had it in contemplation to tender to the new Divorce Commission expert evidence on the very point raised by the report now under discussion, with the object of suggesting that habitual inebriety should, in particular cases, be made a ground of divorce. This suggestion may be supported in the interests—(a) of the possible future children of the marriage; (b) of the community of which they will form part; (c) of the race to which they will belong and to the perpetuation of which they may, in their turn, contribute. The proposition should commend itself not only to those who regard marriage as a contract validated by the State, but to those also who regard it as a sacrament hallowed by the Church. "Marriage," says the Church of England Service, "was primarily ordained for the procreation of children." But surely not for the procreation of "every sort of child," irrespective of its own well-being and of the happiness of the family into which it is born! Would not this, in truth, be to turn a blessing into a curse?

I remain, Sir, your obedient servant,

MONTAGUE CRACKANTHORPE.

May 28.

F 8v

he Council of the Hellenic Society in response
o a request from the British School at Rome
nd other sources—as to the extent of the
emand for the more adequate organization
f Roman studies in England. Between four
r five hundred promises of support were
eceived in response to this inquiry and the
Council of the Hellenic Society, after con-
erence and agreement with the Committee of
he British School at Rome and the Council
f the Classical Association, recommended
he foundation of a Society for the Promotion
f Roman Studies. It was the expressed
ntention of the promoters of this scheme to
void over-lapping of publications and duplica-
ion of library equipment, and to keep the aim
f further co-operation with existing bodies
n view.

At the inaugural meeting a provisional committee will be appointed to draw up the constitution of the Society and name its first officers and council. It is suggested that the constitution of the new Society should follow *mutatis mutandis* that of the Hellenic Society, and the position the older body has come to hold in classical study gives good hope for a society founded and administered on similar lines. Among the speakers will be Mr. S. H. Butcher, Professor Percy Gardner, Sir Archibald Geikie, Professor Haverfield, Lord Justice Kennedy, Professor Reid, and other scholars. The acting secretary, Mr. G. D. Hardinge-Tyler, whose address is 20, Hanover-square, requires it to be known that the presence of all genuinely interested in the cause of Roman studies will be welcomed.

UNIVERSITY INTELLIGENCE.

CAMBRIDGE, JUNE 1.

ELECTION OF VICE-CHANCELLOR.

Mr. R. F. Scott, Master of St. John's College, was to-day elected Vice-Chancellor for the academic year 1910-11. Mr. Scott was Fourth Wrangler in 1875, is a Barrister-at-Law, and was for many years Senior Bursar of his college.

TRIPOS EXAMINATIONS.

At this time of the year there are innumerable examinations going on throughout the University. Apart from those for the ordinary degree and for the various diplomas, there are 1,056 candidates being examined in the various Tripos. These are divided as follows:—Mechanical Sciences, 44; Theology, 54; Oriental Languages, 1; Moral Sciences, 16; Law, 139; Mathematics, 168; Classics, 116; Economics, 27; Natural Sciences, 267; History, 126; and Medieval and Modern Languages, 35.

NEW LECTURER AT CORPUS.

Mr. G. G. Butler, B.A., Scholar of Trinity College, has been appointed resident Lecturer and Director in Historical Studies at Corpus Christi College. Mr. Butler took first-class honours in the Historical Tripos, and was honourably mentioned in the recent examination for the Lightfoot Scholarship for History.

DEGREE OF MUS.B.

The following have passed the examination in music for the degree of Mus.B., Part I.:—

Class I. (in order of merit).—L. H. Pearce, Queens'; J. S. Scott, M.A., Emmanuel; J. B. Johnson, Selwyn.

Class II. (in alphabetical order).—H. G. Hiller, King's; C. G. B. Stevens, Emmanuel; F. J. Waggett, Queens'.

Women.—Class II.—Miss Briggs, Girton.

Part II.—F. P. Hallen, Clare; H. L. Hargreaves, Selwyn.

SUBJECTS FOR PRIZE EXERCISES.

The Rev. H. M. Butler, D.D., Master of Trinity College, having signified his intention of founding a prize for Latin Hexameter Verse, the prize for the ensuing year, if his benefaction is accepted by the Senate, will be given for the best original exercise, not exceeding 150 lines in length, on the subject—"Quaeritur Horatiano more quapropter pomis epica nodis non foveat."

The Adjudicators give notice that the subject of the essay for the Le Bas Prize of the ensuing year is "The Trade of the East India Company from 1760 to 1813."

The essays are to be sent in to the Vice-Chancellor before the end of the Lent Term, 1911, each having some motto prefixed, and accompanied by a paper sealed up, with the same motto and the words "Le Bas Prize" on the outside, and the candidate's full name with his college and the date of his first degree written within. The prizeman receives about £100 and publishes his essay at his own expense.

BERLIN UNIVERSITY CENTENARY.

At the next Congregation an address, written by the Public Orator, will be read, and sealed with the common seal of the University, and presented to the University of Berlin on the occasion of the celebration of the centenary of its foundation.

MANCHESTER, JUNE 1.

HONORARY DEGREES.

The Court of Governors decided to-day to confer the following honorary degrees:—

Litt.D.—Mr. William Warde Fowler, Fellow of Lincoln College, Oxford; the Rev. Edward Lee Hicks, Bishop-elect of Lincoln.

D.Sc.—Mr. W. N. Shaw, F.R.S., Director of the Meteorological Office; Dr. Hugo Muller, F.R.S., Ph.D., LL.D.; Dr. Theodore W. Richards, Professor of Chemistry at Harvard.

Mus.D.—Mr. Felix Alexandre Guilmant, organist.

M.A.—Miss Mary Dendy, of Manchester, and Miss

HEREDITY AND TRADITION.

TO THE EDITOR OF THE TIMES.

Sir,—It is comforting to have Sir Ray Lankester's dictum that "Educability is transmitted in varying amount from parent to offspring by organic continuity," because this statement explains what may go on in the unconscious recesses of our being and it goes far to explain instincts, beliefs, and superstitions.

Educability means potentiality for functioning, and this must depend upon material structure, an actual substance capable of change and evolution; for if there is no material substratum there can be no function, and so educability is a function of an actually existing organization. And if we should expect that this material basis must be modified by the various experiences of life and environment; moreover, if, as Sir Ray Lankester grants, this basis is germinal, the results of its evolution must be transmissible to offspring.

This acknowledgment of Professor Lankester makes feasible the statement of the great psychologist, Wilhelm Wundt, that "the changes which the nervous elements undergo can be transmitted from father to son, and the assumption of acquired dispositions or tendencies is inevitable if there is to be any continuity of evolution at all. We may be in doubt as to the extent of this inheritance; we cannot question the fact itself. Human instincts are habits acquired or inherited from previous generations; animal instincts are purposive adaptations of voluntary action to the necessities of life."

There is great difficulty in understanding the mechanism and the locality of "the unconscious recesses of our being." All nervous processes are latent until something occurs to call them into evidence, but when the stimulus does happen they show themselves in the way in which they have been educated, and the range of these latent processes varies with the circumstances of the environment. There must be multitudes of these latent possibilities which never come into display or into consciousness because the call upon their activity is never made. It follows that most men never realize the extent of the latent nervous demonstrations which are really existent in them, because they are never placed in the conditions which are required to evoke them.

To understand the mechanism of latent ideas and impulses may be, as Sir Ray Lankester says, "barely possible"; but this difficulty is common to other vital processes, the actual existence of which we cannot doubt.

The reference to the impossibility of telepathy is one of the most valuable parts of Sir Ray Lankester's letter. I have elsewhere (lecture at the Polyclinic, May 10, 1910) endeavoured to show the futility of imagining such an action of one brain upon another without the stimulation of one or other of the organs of sense.

I am, Sir, yours obediently,

T. CLAYE SHAW, Emeritus Professor of Psychological Medicine, St. Bartholomew's Hospital, London.

30, Harley-street, W., June 1.

Powers, said :—

The manifestations of the Cretans, whatever their character, cannot effect any change in the legal situation which Turkey desires to have formally recognized. What we ask, what we have always asked, is that the *status* of Crete should once for all be defined and respected ; that, while securing for Crete an autonomy which we have always accepted, the Powers should at the same time secure the maintenance of Ottoman sovereignty which they have always guaranteed. I know that the question is not an easy one and I shall be very careful not to say anything that might complicate the task of the protecting Powers. Indeed, after the conversations which I have had the pleasure of conducting with M. Pichon I can entertain no doubt of his desire to settle the Cretan affair in accordance with legal right and equity.

At the same time, in view of the fact that the Cretans are once more drawing attention to the illegal situation which they have created, I think it my duty to declare that the Ottoman Government will not abandon any of the moderate conditions which it has repeatedly formulated. Even if it wanted to do so it could not. I do not know whether the character of the Cretan problem is adequately realized by the European public. This is not a foreign question for Turkey, it is a national question, a home question, and the Government—any Government—must treat it in conformity with national aspirations. What is offered to the Cretans is no trifle. Autonomy under Turkish sovereignty with a *status* defined by the protecting Powers exempts Crete from the considerable burdens which, from the fiscal and military points of view, she would have to bear if she were united with Greece. This autonomy, by virtue of the Customs facilities which it secures for her in Turkey, will enable her to develop a trade which is already considerable. There is, therefore, no argument based upon the circumstances of the case which militates against the legal arguments. Both the facts of the case and the law are favourable to our contention. I have already had an opportunity of explaining my views to Parliament and I shall have another opportunity on my return home. There must be no room for any doubt in Constantinople with regard to the intentions of the Powers.

I am glad to have had the opportunity of personally expounding the Turkish point of view to Sir Edward Grey and M. Pichon. The French Government, which is making praiseworthy efforts to solve the problem in a satisfactory fashion, knows the sentiments which my country entertains towards it. The visit of the Prince Imperial to Paris, of which his Highness has in every regard carried away excellent recollections, can only draw closer the traditional ties between France and Turkey.

THE ALBANIAN RISING.

MAHMUD SHEVKET'S MISSION.

(FROM OUR SPECIAL CORRESPONDENT.)

PERISOVITCH, MAY 21.

Heredity and Tradition.

We have published recently some interesting letters from eminent men upon Heredity and Tradition and upon Alcoholism and Offspring, which, though based upon rather recondite inquiries and sometimes couched in rather technical language, are recognized by every one as having a bearing upon problems that concern us all. We may express in passing our regret that we cannot always publish such letters with the promptitude that the writers naturally desire. The opportunity does not come every day, and indeed would hardly arrive at all during the busy seasons of the year, were the letters not the subject of greater solicitude than is perhaps readily realised by those who do not know the daily pressure upon space. One of our correspondents has complained of a certain important memoir which we summarised and commented upon not long ago, that it does not form "a practical guide in life." To which another replied that it is not the business of a scientific memoir to form a practical guide in life, but to state ascertained truths upon which people may base rules of conduct. That is all very well; still, when truth is stated or discussed for the benefit of the general public who do not read scientific journals, it is well to remember that what they look for is practical guidance in the affairs of life. They are not interested in abstract theories, or in the sometimes fine-drawn controversies which offer so much temptation to specialists. They would rather hear about the conclusions upon which their teachers are practically agreed than about the refinements upon which their teachers differ; whereas the teachers themselves sometimes dwell much more upon differences, often verbal rather than real, than they do upon the practical bearings of what is more or less common property. There are frequently very important issues involved in a slight variation of a formula, and we would not on any account limit the freedom of men of science to fight out these issues among themselves in terms as abstract as they please to employ. But when they are not quite among themselves, but are enlisting the interest of the general public, logomachy is rather out of place, and a more concrete treatment of questions is desirable. Nor is such treatment anything but a very wholesome exercise for the man of science himself. Was it not LORD KELVIN who remarked that a mathematician does not fully understand his own formulas until he can express their meaning in non-technical language?

There is another reason why the practical guide view should be treated with respect. It is that men of science themselves are not wholly exempt from the influence of a desire to find such a guide in their researches upon subjects such as those dealt with in the correspondence we have in view. Very definite opinions are held by men of science as well as by other people upon temperance, alcoholism, education, and cognate questions. They are opinions not wholly formed upon abstract scientific grounds, but depending a good deal, as in the case of ordinary people, upon temperament, associations, personal tastes, individual experiences, and so forth. The personal equation, in short, however carefully guarded against, enters more largely into psycho-physiological inquiries than into those of, say, the pure physicist. Any aberrations due to this cause are better corrected by what we may call a common-sense treatment of things bearing upon life and conduct than by purely abstract discussion. Thus, while the man of science may actually clarify his own scientific conceptions by occasionally compelling himself to translate them into ordinary language, he also brings the appropriate criticism to bear upon those elements which derive from the more human sources we have just indicated.

In the controversy about Heredity it would tend, if we may be allowed to say so, to greater clearness, both popular and scientific, if more care were taken to observe the broad distinction between physiological inheritance and that vast external inheritance of concepts of all kinds into which we all begin to enter soon after birth. It would be well, also, in seeking convenient arguments in the animal world, to bear in mind the unique position conferred upon man by speech, which enables him to transmit and accumulate experiences, and deductions sound or unsound from these experiences, with a fulness to which there is nothing to correspond among the other animals. Much misunderstanding would be avoided, and much resulting confusion in the public mind, if due care were taken to keep these distinctions always in view. The care required is incessant,

because the two kinds of inheritance blend and mix at a thousand points, yet there is no clear thinking upon some delicate and important questions unless its due place is steadily assigned to each. Some scientifically-minded potentate, if we remember aright, once tried to discover the original language of man by having infants brought up entirely by dead mutes. The experiment was not very fertile, and, in any case, it is not one that we can repeat. But the root idea—to separate physiological inheritance from the subtle all-pervading external inheritance of the race—is one which it is highly important to keep in view.

"Britannia's Mistress."

There was an American lady who once said that it was worth anybody's while to cross "the ocean" to see a British military band march to St. James's Palace. Yesterday I took the opportunity of climbing to the gallery to view the "Master," and as the band of the Coldstream Guards, the drums of the Grenadier Guards, and the pipes of the Scottish Rifles swung into the arena the reason of the American lady's admiration seemed apparent. We Londoners are so used to the Guards' bands that we fail to give full appreciation to their excellence. The climb to the gallery seats certainly brought its reward. It is quite the best place from which to view this inspiring representation of Imperial strength.

The Naval Competitions.

The first competition with the 6in. B.L. guns was won by H.M.S. Vivid, whose representative crew got off their 20 rounds in 58 seconds.

The naval field gun inter-port competition produced a great win for H.M.S. Victory against the crew of H.M.S. Excellent. Last year the Victory crew were not very successful, but yesterday they effected the passage of the chasm and cast their field gun over the wall in only 2 minutes and 25 seconds.

In the evening the H.M.S. Excellent team again won the gun-loading heat, getting off 20 rounds in the average time of 52sec.

In the inter-port field gun competition there was a grand race between the Vivid "A" and "B" crews. In breathless excitement the latter's gun crossed the mark just a foot in front of its rival. The time was 3min. 6sec.

"Aviation Pushball."

This is a new form of mounted sport. It is played by eight mounted men. They play four aside. Each player is provided with a racquet with an elongated handle. The ball is about the size of a large football, and is very buoyant. The game seems to possess many possibilities, and it makes an exciting item on the Tournament programme. Although the game allows of none of the hard galloping that is the chief feature in polo, yet it has so much of that finesse in the combination of skill of eye with skill in horsemanship that it would seem that this game, which we now see for the first time played in the arena at Olympia, might be adapted to those daring horsewomen to whom the rigours of polo are denied.

Results.

Riding and Jumping (Territorial Force).—Corporal J. Ransom, Surrey Yeomanry.

Heads and Posts (Regulars).—Sergeant Veysey, 18th Hussars, 1; S.S.M. Ryder, 21st Lancers, 2; Sergeant Jennings, 21st Lancers, 3.

Sabre v. Sabre (Territorial).—Lance-Sergeant Badman, 16th County of London Regiment, 1; Colour-Sergeant Hammond, 26th County of London Regiment, 2; Lance-Corporal Smeaton, 14th County of London Regiment, 3.

Bayonet Team Combat.—28th County of London Regiment beat the London Division Royal Naval Reserve.

The Evening Performance.

The evening performance was preceded by a little ceremony which must have set every early visitor thinking. At a quarter to 8 the drums of the Grenadier Guards played into the arena the head of a column of Metropolitan and County Divisions of Boy Scouts. There were nearly 3,000 of these youths. Their Chief Scout Master, Lieutenant-General Sir R. S. Baden Powell, was in the Royal box to receive their salute. The column moved into the arena and was marshalled into a solid phalanx of small enthusiasts in slouch hats and many-coloured neckerchiefs. General Baden Powell ordered the parade to "sit at ease." In a moment the boys were either squatting on the tan or resting on their poles. This made a very taking picture. On their being called to attention again General Baden Powell gave the order, "Hats on staves, and three cheers for General Codrington." In a moment the arena seemed filled with a forest of quarter-staves, while the youth shrieked the cheers. Before filing to their seats to furnish the most enthusiastic audience that I have ever yet seen at Olympia the band of organised young Londoners gave three cheers for the general officer.

THE ARMY PAGEANT.

Two performances of the Army Pageant took place yesterday in the grounds at Fulham Palace, and were witnessed by large audiences. Mr. F. R. Benson, Master of the Pageant, has cut down the episodes in order to shorten the time of the performances.

The Church parade, to be attended by 5,000 Territorials, under the command of Major-General Vesey Dawson, C.V.O., will be held at the Army Pageant Ground, Fulham Palace, on Sunday, June 26, at 4.30. The Bishop of Kensington is to address the assembly. Applications for tickets should be made to the hon. secretary, Army Pageant, 122, Brompton-road.

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the only business being [illegible] Bill, the second reading of which was moved by Lord Farquhar. The object of the Bill is to extend to municipal elections the provisions dealing with false statements of fact in relation to the personal conduct or character of a candidate which had been found desirable in Parliamentary elections.

In the brief discussion which took place Lord Jamos of Hereford traced the history