evening, May 7, by Sir Edward Reed, K.C.B., M.P., on "The Forms of Ships." The President, Sir Frederick Bramwell, F.R.S., occupied the chair.

In the course of his address the Lecturer briefly explained the great development which the science of fluid resistance had undergone of late years, largely owing to the labours of Stokes, Rankine and others, but more largely still to those admirable investigations which had been carried out under the patronage of the Admiralty by the late Dr. William Froude, and subsequently by his son, Mr. R. E. Froude. He likewise explained the very great effect which those investigations had produced in the Royal Navy, owing to the judicious and prompt adoption of Froude's results by the Admiralty Constructors. Stress was laid throughout the lecture upon the importance of adjusting the form and proportions of ships not only to the loads which they have to carry, but likewise to the weight of the materials entering into their structure. It was a common error to judge of the merits of steamships by the relations which exist between their displacement, steam power, and speed, as expressed by formulæ of various kinds. Approximations to the theoretical form of least resistance were sought by some naval designers, and all considerable departures from that form were regarded as objectionable. The Lecturer, on the contrary, pointed out that no such theoretical form was any true or proper guide for a naval designer, since every change in the average weight of the hull necessitated a corresponding change in the form and proportions of the ship, and the great merit of a designer often was that he adopted forms differing widely from the abstract forms of the schools, and presenting a very inferior appearance when put into what are known as "Constants of Performance." This was illustrated by examples derived partly from actual ships and partly from calculations made for the purpose. Two actual warships were compared, one attaining the high figure of 213 marks when examined by the received formulæ, and the other gaining but 172 marks; yet in the Lecturer's view the latter was far and away the better ship, because she performed precisely the same service as the other, being inferior in no respect, and yet had cost less than the other by £114,000, and expended no more steam-power in attaining an equal speed. The Lecturer remarked that he should probably have regarded the abstract "form of least resistance" with more respect but for the circumstance that the designing of armoured vessels in which he was much engaged is "a branch of naval construction of much too concrete and ponderous a character to admit of any dalliance with abstract or fancy forms." He went on to express his regret that, owing largely to the restrictions which granite docks imposed upon naval constructors, and to the absence of iron floating docks capable of receiving ships of any form, and owing to other causes likewise, the construction of armoured ships—by which he meant ships which had a sufficient volume protected above the water to keep them afloat and upright while the armour remained intact—had been abandoned, and the first place upon the sea had been offered to any nation which had the courage and the will to assume it. In his opinion this was a purely voluntary abandonment, and was not the result of any scientific or economic necessity. He admitted that great changes in forms and proportions were very desirable in our great line-of-battle ships; for example, a great increase of breadth was necessary in order to economise the side armour, and to keep the ram and torpedo at ample distance from the boilers and magazines, which should be protected by an inner citadel, so to speak, well removed from the outer one. But so far was true science from presenting obstacles to these and other important changes, it actually invited these very changes, and increase of beam in particular had been shown by Froude to facilitate the attainment of practical invulnerability combined with very high speed. Size and cost were among the bugbears of our naval administration; by the true engineer they were always regarded as secondary to great and noble objects, among which objects he included the naval preeminence of our country. At any rate, there was no engineering obstacle whatever to England constructing and sending to sea, not merely those great and swift but delicate and fragile Atlantic hotels in which the British Navy is now to embark and fight, for the want of something better, but also war-ships—real war-ships—almost as invulnerable as these islands themselves, and capable of bearing the once-proud flag of England boldly into the waters of any enemy whatever.

On the motion of the President, a cordial vote of thanks was passed to Sir Edward Reed for his interesting and instructive lecture.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—In the second part of the Natural Science Tripos the examiners have placed the following in the first class in alphabetical order:—Men: Acton (Botany), St. John's; Eve, B.A. (Physics), Pembroke; Fitzpatrick (Physics), Christ's; Gordon (Physiology), Trinity; Shore (Physiology), St. John's; F. M. Young, B.A. (Physics), Trinity.

The Senior Wrangler, Mr. Berry, of King's College, was a student at University College School and College; the Second Wrangler, Mr. Love, of St. John's, was educated at Wolverhampton Grammar School. The Wranglers, thirty-four in number, are alone eligible to compete in the third part of the Mathematical Tripos a year hence.

In the Natural Sciences Tripos, Part I, the following were placed in the first class, in alphabetical order:—Men: Bury, Trinity; Couldridge, Emmanuel; Edgeworth, Caius; Evans, F. P., St. John's; Oliver, F. W., Trinity; Rolleston, St. John's; Seward, St. John's; Walters, H. G., Trinity. Women: Freund, J., Girton; Willoughby, C. A. J., Newnham.

The University Lectureship in Mathematics, lately held by Prof. J. J. Thomson, will be filled up by the General Board of Studies and the Special Board for Mathematics early in the Michaelmas Term.

It is proposed, in dealing with the increased income of the Craven Fund, to establish a new Studentship of 200*l.* a year for research in the Languages and History of Ancient Greece and Rome and the Comparative Philology of the Indo-European Languages; the Studentship to be tenable for one year, but a student might be re-elected on not more than two occasions.

It is proposed still further to systematise and improve the courses of local lectures in populous centres, and to give students University certificates and exemptions in all cases where satisfactory work has been done, instead of confining these special privileges to affiliated Colleges. The majority of the courses given in the past winter have been scientific, and the work continues to extend, under the energetic administration of Dr. R.D. Roberts. Much difficulty exists in some of the most promising centres, where the students (miners and artisans) are poor, in providing funds. There ought to be no difficulty in persuading colliery proprietors and manufacturers to find the money needed.

SCIENTIFIC SERIALS

Bulletins de la Société d'Anthropologie de Paris, 5me Fascicule, 1884.—On ancient superstitions still surviving among the Bretons, by M. Bonnemère. An interesting paper, showing among many other proofs of superstition that the peasantry believe in the possession by certain individuals, whom they characterise as "Ribotteurs," of the power of injuring others by causing their milch cows to lose their milk. The so-called "Ribotteurs" are believed to acquire this power by roaming naked through the fields on the night of April 30 to gather, at early dawn, the May dew, in which dwells the malevolent property of drying up the milk of cows.—On the uni-discoidal placenta of a mandril, by M. Chudzinski.—On the degree of atrophy of the olfactory nerves compatible with the persistence of the sense of smell, by M. Mathias Duval. The writer draws attention to the number of cases in which a post-mortem examination has proved the atrophy, or even total absence, of olfactory nerves, although there had been no apparent defect in the sense of smell during life. M. Dally is of opinion that in such cases an excess of the gray matter of the brain at any one point may serve to supplement a deficiency in some other cerebral region.—M. Topinard presented to the Society a copy of his great chart of the relative heights, registered among the conscripts and in the public schools of different parts of France.—Report of proceedings at the first meeting of the "Conférence Transformiste," organised last year in memory of Darwin. In accordance with the scheme of the Conference an address was to be annually delivered by a member of the Anthropological Society of Paris, who was to indicate the influence which Darwinian ("Transformist") views had had on the special branch of scientific inquiry which the lecturer prosecuted.—This year's address in the Physical Section of the Conference was delivered by M. Duval, who chose for his theme the evolution of the eye from the early development of the visual organs among the lower animals. His treatise is profusely illustrated by admirable dia-

grammatic woodcuts.—In the Psychical Section of the Conference M. Letourneau treated of the evolution of morality, tracing the rise and progress and various fluctuations of the moral sense among different races.—M. Pozzi, in announcing the decision of the Committee for awarding the Broca prize, explained that he and his colleagues had selected the works of three among the numerous competitors, viz. MM. Collignon, Chudzinski, and Testut, as of pre-eminent merit. The prize was, however, unanimously awarded to the last-named, M. Testut's great work, "Muscular Anomalies in Man explained by Comparative Anatomy," having secured him this distinction both on account of its able and exhaustive character and its great literary merits. The selected essays of MM. Collignon and Chudzinski, treated respectively of the "anthropometric differences of the leading races of France," and of the "Anatomy of the Negro." In his address M. Pozzi gave a summary of M. Testut's work, of which he spoke in terms of unqualified praise, both as regards the methods with which his observations had been conducted, and the manner in which the results were compared and tested.—Report of the eulogy on Paul Broca, delivered by M. Dally on the day the Broca prize was awarded for the first time. As an old friend and colleague, M. Dally, in his historical and literary notice of the life and works of Broca, was able to give many hitherto unknown particulars, which add largely to the interest of his address.

Bulletins de la Société d'Anthropologie de Paris, 1er Fascicule, 1885, containing *résumé* of the rules, organisation, and actual condition of the Society, with lists of members, affiliated societies, and recent obituary, &c., &c., &c. Among the works presented to the Society at its inaugural meeting, 1885, special notice is due to the "Elements of General Anthropology," by M. Topinard, who here gives a *résumé* of his lectures at the School of Anthropologie since 1876; the "Gitaños of Spain and Portugal," by M. Bataillard; "Ethnic Mutilations," by M. Magitot; and "Cannibalism among the Red-Skins," by M. Letourneau. In regard to each of these, the authors treated at great length of the objects aimed at in their respective works, the character and scope of which they fully explained.—M. Chudzinski presented the Society with the cast of the deltoid muscle of a negro, showing an anomalous separation of the bundles, which had a Simian character.—M. Delisle drew attention to an ox's head belonging to *Bos indicus* of Senegal, in which a perfectly developed horn protruded from between the nasal bones.—A paper by Dr. Hoffman, of Washington, on a curious relic found in South California, supposed to have been a case for keeping the colouring-matters and instruments employed in tattooing.—On the Quaternary deposits of Rosny (Nogent-sur-Marne), by M. Eck. Among these finds are fine teeth of *Elephas primigenius*, *Rhinoceros tichorhinus*, *Equus*, &c.—Report by M. Gouïn, of Cagliari, on the skulls and objects found by M. Issel in the recently-opened cave at Orreri, in the Island of Sardinia. M. Issel believes, from his study of the prehistoric remains of Western France, Spain, and the basin of the Mediterranean generally, that these and the finds at Orreri all point equally to the diffusion of a primitive race, which was extant in the Canary Isles within historic times.—On Laos, by M. P. Neis, who explored the Laotian territory bordering on Cambodia in 1882-84. The author, as a French official, enjoyed exceptional advantages for travelling in Cochin China and the neighbouring districts, and his careful study of the character and habits of the people has enabled him to collect much interesting information regarding the distinctive anthropological and social characteristics of the different races of Indo-China. M. Neis sees no ground for the opinion that these races exhibit traces of a Negrito element, but he draws attention to the fact that everywhere the Mongol is displacing the Thay and other ancient nationalities, although this is most evident in the territories between Mam-on and Tonkin, and he believes that, unless the King of Siam takes prompt measures to stop this invasion, Siamese supremacy and French authority will be alike endangered.—Ceylon and its inhabitants in ancient and modern times, by M. Beauregard. The author derives his materials from English sources.—On the caves of Saumoussay, by M. Bonnemère, who believes that these grottoes served in prehistoric ages as a tannery.—On the measurements of the long-bones as a basis for the reconstruction of the entire skeleton, by M. Topinard, with plates of the osteometric instrument used by Broca.—On will, considered from a physiological point of view, by M. Fauvelle.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 7, with a note added May 12.—"On the Electric Resistance of a New Alloy named Platinoid." By J. T. Bottomley, M.A., F.R.S.E.

In the course of a series of experiments on the electric resistance of various metals and alloys and in particular on the variation of the electric resistance of these metals and alloys with temperature, the author has examined a new alloy (called by the inventor "platinoid"), which has turned out to have important properties.

This alloy is the invention of Mr. F. W. Martino, of Sheffield, who kindly supplied specimens of the metal, and wires specially drawn down to the finer gauges for experiments.

Platinoid is practically German silver with the addition of a small percentage (1 or 2 per cent.) of metallic tungsten. The tungsten is added in the form of phosphide of tungsten, a considerable percentage of which is in the first place fused with a portion of the copper. The nickel is then added; and then the zinc and the remainder of the copper. The mixture requires to be re-fused more than once, and during the process the phosphorus and a considerable portion of the tungsten originally added is removed as scoriæ. In the end there is obtained a beautiful white alloy, which is platinoid. When polished the alloy is scarcely distinguishable in appearance from silver. To test the quality claimed for it as to being untarnishable, the author has been keeping ornamental specimens lying exposed to the ordinary town atmosphere; and has satisfied himself that the alloy has a very remarkable power of resisting the tarnishing influence of the air of a large town.

It is, however, the electric resistance of platinoid that has chiefly interested the author. German silver wire has proved of great use in the construction of galvanometer coils and resistance coils, on account of two important properties, viz., its very high resistance and the smallness of the variation of its resistance with change of temperature. Both those properties are possessed in a still higher degree by platinoid alloy.

The resistance of German silver differs considerably in different specimens. It is commonly stated to be $21{\cdot}17 \times 10^{-6}$ B.A. ohms between opposite faces of a centimetre cube at 0° C.;[1] or, reducing to legal ohms, $20{\cdot}935 \times 10^{-6}$ legal ohms between the opposite faces of a centimetre cube. The following table shows the resistance of a number of specimens of platinoid wire:

Specifying number	Diameter in decimals of a centimetre	Cross Section	Resistance legal ohms per metre	Resistance between opposite faces of a centimetre cube legal ohms.
16	·1610	·0204300	·181	$36{\cdot}98 \times 10^{-6}$
17	·1430	·0160200	·202	32·36
18	·1230	·0119400	·288	34·38
19	·1110	·0096770	·353	34·16
20	·0865	·0058760	·555	32·61
A	·0595	·0027180	1·250	$34{\cdot}76 \times 10^{-6}$
B	·0495	·0019240	1·707	32·85
28	·0402	·0012690	2·605	33·06
29	·0340	·0009070	3·412	30·94
32	·0290	·0006605	4·371	28·87
36	·0220	·0003801	8·219	31·24

It appears from these results that the specific resistance of platinoid is about *one and a half* times that of German silver.

The experiments on the variation of resistance of platinoid with temperature were carried on in the following way. The specimen of platinoid to be tested was wound on a wooden bobbin, on the surface of which a screw had been cut, and the spires of the helix were kept separate by lying between the threads of the screw. This coil was immersed in a bath of oil, and was connected in series with a known wire of German silver, the temperature of which was kept constant, and with a single Daniell's cell. The differences of potential between the two ends of the platinoid wire and the two ends of the German silver wire were determined by applying the electrodes of a a high-resistance galvanometer. The ratio of the differences of potential is the same as the ratio of the resistances of the two wires.

[1] Given by Prof. Fleeming Jenkin, F.R.S., as expressing the results of Matthiessen's experiments.