

Black-backed Jackal (*Canis mesomelas*) from South Africa, presented by Mr. R. C. Cooper; a Wild Cat (*Felis catus*) from Scotland, presented by Mr. Claude Alexander; a Silver Pheasant (*Euplocamus nycthemerus*, ♂) from China, presented by Mr. W. McNaughton Love; two Thars (*Hemitragus jemlaicus*, ♂ ♀) from the Himalayas; a Long-billed Butcher Crow (*Cracticus destructor*) from New Holland; a Laughing Kingfisher (*Dacelo gigantea*) from Australia, deposited; a Thick-tailed Opossum (*Didelphys crassicaudata*, ♀) from La Plata, a White-eyebrowed Guan (*Penelope superciliaris*) from South-east Brazil, a Little Guan (*Ortalis motmot*) from Guiana, three Elliot's Pheasants (*Phasianus ellioti*, ♂ ♀ ♀) from China, purchased.

OUR ASTRONOMICAL COLUMN.

COMET 1899 *a* (SWIFT).—Three telegrams have been received from Kiel announcing the discovery of the first new comet of this year. Two observations of it appear to have been made, the respective positions being as follows:—

1899.	R.A.	Decl.
	h. m. s.	
March 3 ...	3 45 0	− 29 0 0
4 ...	3 48 0	− 27 7 0
6 ...	3 37 8	− 24 8 32

It is described as being bright enough to be seen with the naked eye, and having a slow movement.

The comet should be looked for immediately after sunset in the south-eastern sky. At present it is about 12° due south of the 2nd magnitude star γ Eridani, passing the meridian about 5.30 p.m. As a guide to its position, it is nearly on the line joining α and β Orionis, about twice as far from the latter as these two stars are apart.

TUTTLE'S COMET.—Another telegram from Kiel communicates an ephemeris of this comet, which has been computed by J. Rahts from data obtained in 1885.

Ephemeris for 12h. M. T. Berlin.

1890.	R.A.	Decl.	Br.
	h. m. s.		
March 5 ...	0 59 58	+ 33 36.2	...
7 ...	1 7 23	33 17.8	0.62
9 ...	14 51	32 58.5	...
11 ...	22 21	32 38.2	0.66
13 ...	29 52	32 16.9	...
15 ...	37 25	31 54.4	0.70
17 ...	45 0	31 30.8	...
19 ...	1 52 35	31 6.2	0.75
21 ...	2 0 10	30 40.0	...
23 ...	7 47	30 12.8	0.80
25 ...	15 23	29 44.2	...
27 ...	2 23 0	+ 29 14.4	0.86

The brightness, in terms of its intensity in 1885, August 10, this being unity. The above positions extend from about half-way between α and β Andromedæ to the centre of the constellation Triangulum. It should be looked for soon after sunset.

As we go to press, a telegram has been received announcing the observation by Herr Wolf of a comet sufficiently near the position given in the above ephemeris to suggest its being the same. The coordinates are as follows:—

1899.	R.A.	Decl.
d. h.	h. m. s.	
March 5 11.5	1 16 0	+ 31 38 0

No information is given concerning the brightness of the comet.

LOWELL OBSERVATORY.—In "Popular Astronomy," vol. vii. p. 74, Mr. A. E. Douglass gives a *résumé* of the planetary work which has been done at the Lowell Observatory, Flagstaff, Arizona, during the past four years. Observations of Mercury, by Messrs. Lowell and Drew, confirmed Schiaparelli's result that the planet rotates once during its revolution round the sun. Lines of various widths and dark patches were seen. Venus was examined by the same observers, and also found to continuously present the same aspect to the sun. The markings are faint but certain with good seeing. The prevailing straw-

colour seen is ascribed to the presence of an atmosphere. Mars has received special attention, Mr. Lowell having found a number of new canals and lakes. Much time was spent in tracing the seasonal changes on the planet. The white South Polar cap was observed to diminish as the equinox approached, and at the same time a dark line formed round it, the grey tint of the south temperate zone assuming a distinct bluish green, strongly suggestive of growing vegetation. Later this zone turned brown, and finally to a slowly lightening yellow.

The frequently observed projections on the terminator are ascribed by Prof. W. H. Pickering to clouds in the Martian atmospheres. These clouds appear to only form during the planet's night; and this, if true, helps to explain the high mean temperature of the planet as was suggested, in 1892, by Prof. Pickering.

Vesta is found to have a polar compression of $\frac{1}{10}$, the major diameter being almost in the direction of its orbit. The markings detected indicate a direct rotation in less than thirty hours. Jupiter's satellites have been carefully observed to compare with the results of Prof. Pickering at Arequipa in 1892. The period of rotation of Satellite I. is found to be 12h. 24' 0m.; its ellipticity is perceptibly greater than in 1892, and its mean diameter slightly less. Detail was seen in Satellite II., showing rotation, but no time deduced. Satellites III. and IV. have direct rotation, always presenting the same face to Jupiter.

The paper concludes with a proposal to establish a systematic notation for further expressing the observing conditions under which astronomical work is carried on. The author gives a "scale of seeing," based on the appearance of the stellar image in a lens of six inches aperture.

THE NORTHERN POLYTECHNIC, HOLLOWAY.

TO form a correct estimate of the existing provisions for the education of the millions who are crowded into the metropolitan area, it is essential to give an adequate consideration to the work being done by the fifteen separate institutions and branches which are included under the London polytechnics. The buildings in which this work is being accomplished may be estimated to have cost at least half a million sterling in capital outlay, and to be expending about 130,000*l.* annually upon some 50,000 students of the multitude of subjects for which provision is made. The receipts from fees and other miscellaneous sources do not exceed 30,000*l.*, leaving 100,000*l.* to be met from other funds. Private subscriptions probably amount to 10,000*l.* The contributions of the City Companies (principally the Drapers', Goldsmiths', and Skinners') provide some 20,000*l.* more. But at least 70,000*l.*, or about two-thirds of the net cost of the work, is drawn from public funds. The grants of the Science and Art Department may be estimated at 10,000*l.* The Central Governing Body of the City Parochial Charities contributes altogether about 30,000*l.*, and the London County Council, through its Technical Education Board, supplies 30,000*l.*, definitely allocated to the part of the work falling within the statutory definition of technical instruction.

"Each polytechnic institute is an independent organisation, unique in its deliberate combination of social intercourse, recreation and instruction. It is not subject to control by any Government department or other authority, and free, within the limits of its own trust-deed or other constitutional document, to move in whatever direction may be determined on by its governing body." They are, however, with one exception, based upon schemes of the Charity Commission and subject, to a certain extent, to ultimate control by that body. They necessarily defer to any suggestions made by the trustees of the City Parochial Charities, since they, all but two, receive large sums of money from them. The Technical Education Board of the London County Council exerts a very real authority over the educational work carried on in these institutions; for all of them, with two exceptions, are in a great measure dependent upon the large subsidies from this source.

It must not be lost sight of that "in every polytechnic institute the club rooms for men and women respectively, the concerts and entertainments of various sorts, the popular lectures and excursions, form a leading feature. Well-equipped gymnasia and playing-fields, billiards and other games, reading-rooms and lending libraries, as well as mutual societies of all kinds (debating, essay, Shakespeare, swimming, rambling, cycling,

cricket, rowing, photography, and many others), enrol tens of thousands of members." It is to this part of the expenditure that (besides members' fees, and the private subscriptions) part of the contributions from the Parochial City Charities Fund are to be regarded as contributing.

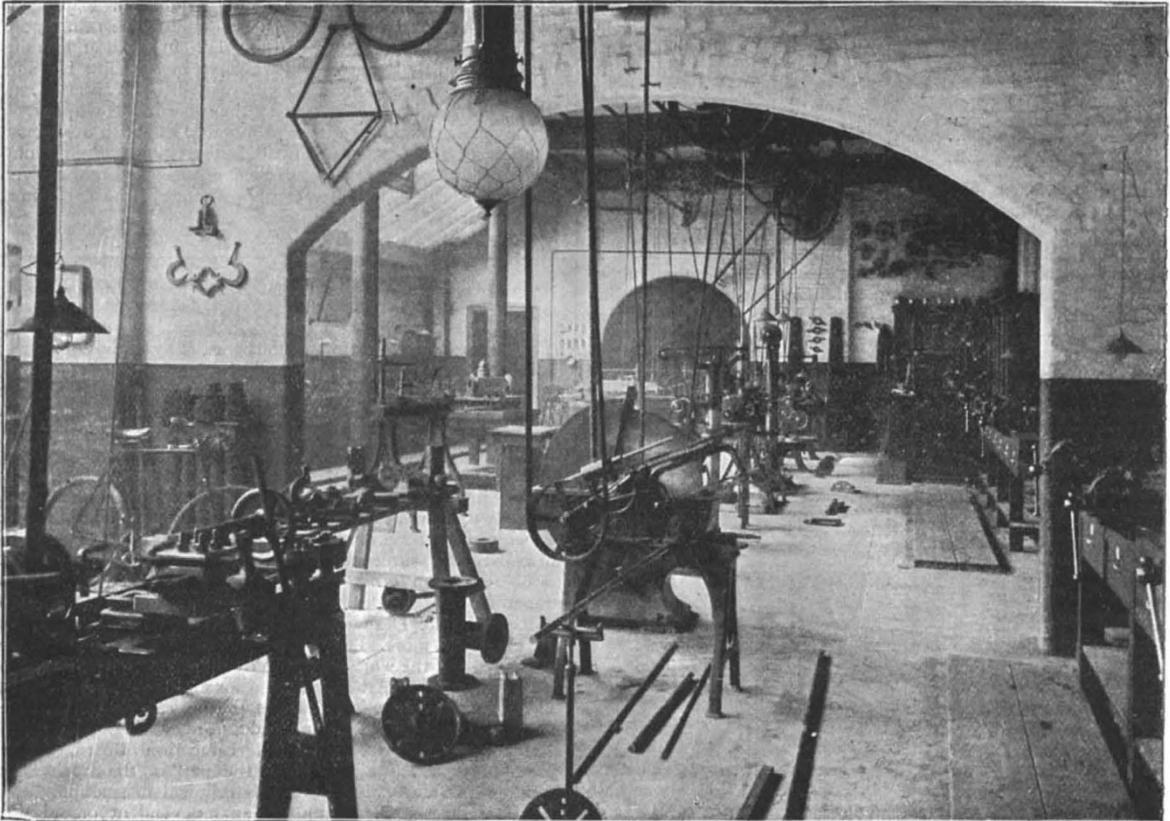
The London Polytechnic is a pure addition to the educational system, neither competing with, nor superseding, previously existing institutions. There is no reason to believe that the alleged stagnation of the London University colleges and secondary schools is in any way connected with the remarkable growth of the polytechnics since 1890.¹

The Northern Polytechnic Institute² was founded under a scheme of the Charity Commissioners, in accordance with the provisions of the City of London Parochial Charities Act, 1892. The scheme provides for the government and administration of an institute for educational and recreative objects, and endows it with an annual sum of 1500*l.* for maintenance, on the supposition that suitable buildings are assured from other sources.

grants made by the Technical Education Board of the London County Council.

The income of the Northern Polytechnic is made up as follows: (1) the amount, previously mentioned, received under the City Parochial Charities; (2) special grants made by the Central Governing Body, up to the present amounting to about 500*l.* per annum; (3) grants from the Technical Education Board, amounting for the session 1897-8 to 1900*l.*; (4) grants for attendance, or on the results of examinations, made by the Science and Art Department and the City and Guilds of London Institute, but which, in the absence as yet of a complete working year, cannot be exactly estimated; (5) students' fees, which for the last working year amounted to 1300*l.*; (6) fees received for hire of the large hall, and private subscriptions.

The more important items of expenditure are—salaries and wages, 4100*l.*; fuel, light, and water, 500*l.*; advertising, printing, stationery, and postage, 500*l.*; rates and insurance, 200*l.*



A Laboratory of the Northern Polytechnic.

Subscriptions to the amount of 25,000*l.* were secured for that purpose, largely from private sources, but chiefly through the munificence of the Clothworkers' Company, and a site was obtained in the Holloway Road. Plans for the erection of an institute were prepared in 1893, but, in the first place, only the buildings necessary for educational purposes were erected. The cost of the site was 8500*l.*, and its total area is about one and a quarter acres. The buildings at present completed, at an expenditure of 28,000*l.*, cover some 3400 square yards of the site.

Up to the present some 8000*l.* has been spent upon the equipment of the institute. In every department a fairly complete set of apparatus and fittings for elementary work was provided from the beginning, and instruments for more advanced work have been added, as required, from special equipment

¹ The reader is referred to Mr. Sidney Webb's able paper in "Special Reports on Educational Subjects," vol. ii., for further general information respecting London polytechnics.

² See the excellent illustrated account by Dr. Dunn in the *Record of Technical and Secondary Education*, January 1899.

THE WORK OF THE NORTHERN POLYTECHNIC.

Almost the whole of the work has as yet been carried on in evening classes, but arrangements are to be made for complete courses of study during the day. In the words of the Principal, Dr. J. T. Dunn, "for the most part the work is *Brodstudien*—the object of the students is to gain knowledge which will be of service to them in their daily work, present or prospective, and any mental training which they receive is incidental." Within this limitation, however, every effort is made to co-ordinate the work of the different departments. Thoroughness is aimed at, and the students are encouraged to study cognate subjects bearing upon their own particular work. The artisan is urged to take up the branches of science upon which the practice of his trade depends, and in both the science and technological classes the greatest importance is attached to practical exercises. As in nearly every other technical institute in the country, the value of the work accomplished is very much discounted by the want of general preliminary training exhibited

by the students who present themselves for instruction in science and technology.

Broadly, the work of the evening classes may be grouped under the heads of (1) mathematics and science, (2) technology, (3) commerce and economics. A fair number of students, however, study languages and other literary subjects.

In addition to the classes in the various branches of study included under physics there is a three years' course in electrical engineering, and workshop classes are arranged for the fourth and succeeding years in electric wiring, fitting, &c. Courses in telegraphy and telephony are to be held later to supplement the other work.

Students in the department of engineering begin with elementary machine drawing, and are only admitted to the mechanical engineering lectures after they have made a certain amount of progress in such drawing. There is also workshop practice in fitting and machining, smith-work and pattern-making. Students work for two or three evenings a week in the shops, at a regular course of filing, chipping, scraping, &c., and are not allowed to go to the machines till they have proved their efficiency at hand work.

The department for the building trades is probably the most numerously attended, a natural result of the fact that these trades are strongly represented in the neighbouring localities. An endeavour is made to get all technological students to go through a course of building construction and to acquire an elementary acquaintance with mathematics, practical geometry, and experimental science. A short course of lectures on the chemistry of building materials is given. Classes in builders' quantities and quantity surveying are held, and practical work is done in the brick-work and plumbing shops. A collection of specimens of various woods arranged for students' inspection at any time, and practical work in masonry, plasterers' work, house-painting and decorating, complete the facilities placed at the disposal of all engaged in the building trade.

In addition to a very complete course of lectures and practical work in pure inorganic and organic chemistry, there have been arranged in the chemical department, lectures to trade class students on various technical applications of chemical and physical science, and a course of elementary experimental science, given by the Principal and the Head of the physical department. This simple course forms an introduction to the more systematic work in the chemical and physical departments, as well as providing the necessary preliminary training for students of technology.

The department of commerce and economics at present includes classes in book-keeping, shorthand, type-writing, and general commercial subjects. French and German are also extensively studied.

The women's department is in an undeveloped condition. Needlework, dressmaking, and millinery are the only subjects for which provision has yet been made. With the completion of the new buildings, now being erected, the organisation of classes in cookery, laundry-work, and general housewifery will be brought to perfection, and a day school of domestic economy will be started.

The Northern Polytechnic has, in addition to the students already referred to, a number working for University degrees, and many studying literature, vocal and instrumental music, elocution, and other subjects of a similar more or less recreative character.

The rapid increase of the numbers seeking admission has already raised a difficulty as to accommodation, and for the 2000 individual students at present enrolled every available inch of space has had to be utilised.

A. T. SIMMONS.

THE DUKE OF DEVONSHIRE ON THE SECONDARY EDUCATION BILL.

A DEPUTATION representing a conference held in Manchester under the auspices of the Victoria University on the subject of secondary education, was received on Friday last by the Duke of Devonshire, Lord President of the Council, the object of the deputation being to present to the Lord President the following resolutions, which were passed at the Manchester Conference:—

(1) That, in the opinion of the conference, a Minister of Education of Cabinet rank should represent the Education Department in Parliament; (2) that the creation of the consultative

committee mentioned in Clause 3 of the Bill should be obligatory, and that the committee should be so composed as to be competent to advise as well on the various grades of technical as on those of secondary education; (3) that it is desirable that immediate provision be made for the institution of local authorities for secondary education; (4) that the relations of the proposed board of education to the Charity Commissioners should be more clearly defined in the Bill, so as to avoid as far as possible the risk of dual control.

We print, from the *Times* report, an abridgment of the speech delivered by the Duke on the occasion.

As to the resolutions they had brought before him, he was happy to see that the first one practically endorsed the action of the Government in relation to the Bill which was introduced last year. The Bill which will shortly be introduced will probably be altered in some respects as to the constitution of the new Education Department; but he hoped that such alteration would make it more satisfactory than even the provisions of the Bill of last Session.

The subject upon which Principal Bodington chiefly spoke was that of the second resolution relating to the appointment and constitution of a consultative committee. Principal Bodington said that a certain amount of apprehension had been felt in some quarters that the assumption by the Government of supervision or control over secondary education might possibly have the effect of crushing out the individuality which has hitherto characterised the secondary school system, and might tend in the direction of undue uniformity. He could assure them that no such idea has entered into the minds of the present Government, and that they are perfectly aware, and feel as strongly as it is possible to feel, that it would be in the very highest degree undesirable to attempt, in relation to secondary education, to establish any such uniformity of system as must, perhaps necessarily, exist as regards primary or elementary education. And in so far as the appointment of an advisory committee may tend to make it impossible that any such result may follow, he attached very considerable importance to the constitution of such a committee. Principal Bodington admitted, however—and that is a point on which he felt equally strongly—that the appointment of the committee must not be allowed in any degree to impair the responsibility of the Minister himself.

It would, he thought, be a very unfortunate departure from our constitutional system if the Minister were able to feel that he was not absolutely and entirely responsible for the action of his department, and if he were able to take shelter under the advice of the consultative committee, however representative that committee might be.

As to the constitution of the consultative committee by the Bill to be introduced, he did not think it would be desirable to enter into too minute details. Words, however, he thought, might very well be inserted in the clause setting forth that the intention is to give it that representative character—representative of the Universities, representative of other parties interested in education, representative of the teachers themselves, as well as persons directly nominated by the Government,

Secondary education ought probably in the new department to have a sub-department of its own; and technical education probably will remain, for the present, at all events, more closely connected with the Science and Art Department. Secondary education is concerned with boys and youths; technical education is concerned with youths and people of more advanced age; and he doubted very much whether it would be possible, without unduly enlarging the size of the consultative committee, to entrust to the committee duties connected with both secondary and technical education.

Not much had been said by the deputation on the subject or the third resolution—the institution of local authorities for secondary education. He trusted that anybody who did him the honour to read the speech he made on the subject last year will recognise that the Government are not in the smallest degree insensible to the urgency of the constitution of these authorities. If they refrained this Session from embodying proposals on that subject in the measure which constitutes the central authority, it would be for the reason stated last year.

He could give the strongest assurance that nobody could feel more than the Government that a measure which does not deal with the constitution of local authorities must necessarily be an utterly inadequate and imperfect one, and that it is the Government's firm intention, if they should be successful in passing the