Berlin. It may be remembered that in our note of a fortnight ago (vol. 46, p. 596), it was announced that Prof. Emil Fischer and Dr. Landsteiner had succeeded for the first time in preparing this interesting substance in a state of tolerable purity by a reaction analogous to that of barium hydrate upon acrolein dibromide, the reaction which yielded the first synthetical glucose. They first prepared the mono-bromine, derivative of common aldehyde, $CH_2Br.CHO$, and subsequently reacted upon this new substance, a liquid possessing an intolerably sharp odour, with baryta water. After removal of the baryta by sulphuric acid, and the hydrobromic and sulphuric acids by means of carbonate of lead, a liquid was obtained which possessed the properties of a dilute solution of glycol aldehyde. Some time ago Pinner obtained a derivative of this aldehyde which bore the same relation to glycol aldehyde, that the compound known as acetal, $CH_3.CH(OC_2H_5)_2$, bears to common aldehyde. This substance, glycol acetal, $CH_2OH.CH(OC_2H_5)_2$, Pinner attempted to decompose, by the action of mineral acids, into ethyl alcohol and glycol aldehyde. The attempt, however, did not succeed, inasmuch as the decomposition went further, any glycol aldehyde that may have been formed during the first stage of the reaction being subsequently broken up. Drs. Marckwald and Ellinger now find that the reaction succeeds admirably, provided the acid employed is extremely dilute, and as glycol acetal is a substance very easily prepared, they show that the reaction affords a very convenient and advantageous method of preparing large quantities of glycol aldehyde. The glycol acetal is added to an equal volume of water acidified with only a few drops of sulphuric acid. The liquid is then heated to boiling. After a short time the two liquids mix, and the reaction is completed when upon the addition of water to a few drops of it no separation of oil occurs. Upon distilling the liquid product, alcohol first passes over, then there distils a mixture of water and glycol aldehyde until decomposition of the residue commences. Glycol aldehyde, as thus obtained in a tolerably concentrated form, appears to be much more volatile in steam than was observed by Prof. Fischer and Dr. Landsteiner, in case of their more dilute solutions. From a few cubic centimetres of the distillate Drs. Marckwald and Ellinger obtained a very considerable quantity of Prof. Fischer's phenylhydrazine compound, and confirm in every detail the other properties of glycol aldehyde described in our previous note above referred to. The chemistry of this first member of the series which includes the sugars is now, therefore, fairly complete, and the difficulties in the way of its preparation surmounted.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus* ♂) from India, presented by Mr. Pascoe Grenfell, F.Z.S.; a Philantomba Antelope (*Cephalophus maxwelli*) from West Africa; three Gambian Pouched Rats (*Cricetomys gambianus*) from West Africa; a Ground Rat (*Aulacodus swindernianus*) from West Africa; and a White-faced Tree Duck (*Dendrocygna viduata*) from West Africa, presented by Mr. C. B. Mitford; a Martial Hawk-Eagle (*Spizaetus bellicosus*) from South Africa, presented by Mr. T. White; two Weaver Birds (*Hyphantornis sp. inc.*) from South Africa, presented by Mr. A. W. Arrowsmith; two Silver Pheasants (*Euplocamus nycthemerus* ♂ ♂) from China, presented by Mr. E. Mitchener; a Common Chameleon (*Chamæleon vulgaris*) from North Africa, presented by Miss Kate Higgins; a Thick-tailed Opossum (*Didelphys crassicaudata*) from South America; a Garden's Night-Heron (*Nycticorax gardeni*); and two Saracura Rails (*Aramides saracura*) from South America, purchased; and a Squirrel Monkey (*Chrysothrix sciurea*) from Guiana, deposited.

OUR ASTRONOMICAL COLUMN.

COMET BROOKS (AUGUST 28).—The following ephemeris, which we take from *Astronomische Nachrichten*, No. 3125, gives the apparent Right Ascensions and Declinations of Comet Brooks, which is brightening very rapidly:—

12*h*. *Berlin M.T.*

1892.	R.A. app. h. m. s.	Decl. app. ° ′	Log. *r*.	Log. Δ.	Br.
Nov. 3 ...	9 23 51 ...	+9 55·8			
4 ...	27 50 ...	9 9·8	... 0·1265	... 0·0225	... 11·60
5 ...	31 51 ...	8 22·7			
6 ...	35 55 ...	7 34·6			
7 ...	40 1 ...	6 45·4			
8 ...	44 10 ...	5 55·2	... 0·1125	... 0·0034	.. 13·51
9 ...	48 21 ...	5 4·0			
10 ...	52 34 ...	4 11·8			

Lying in the extreme northern corner of the constellation of Sextans, and nearly midway between ρ Leonis and ε Hydræ, it will not be an easy object for observation owing to its very late rising.

COMET BARNARD (OCTOBER 12).—Prof. R. Schorr, of Hamburg, communicates to *Astronomische Nachrichten*, No. 3125, the elements and ephemeris of Comet Barnard, deduced from observations made on October 16, 18, and 20, at Vienna, Hamburg, and Pulkowa respectively. As this ephemeris differs rather considerably from the one we gave last week, the following places may prove of service to observers:—

12*h*. *Berlin M.T.*

1892.	R.A. h. m. s.	Decl. ° ′	Log *r*.	Log Δ.	Br.
Nov. 3 ...	20 24 38 ...	+5 3·7			
4 ...	27 20 ...	4 44·0			
5 ...	30 4 ...	4 24·6	... 0·2298	... 0·1539	... 1·00
6 ...	32 48 ...	4 5·4			
7 ...	35 34 ...	3 46·4			
8 ...	38 21 ...	3 27·8			
9 ...	41 9 ...	3 9·4	.. 0·2278	... 0·1590	... 0·99
10 ...	43 58 ...	2 51·2			

This comet will still be found to form approximately an equilateral triangle with α Aquilæ and β Delphini on November 5.

TABULAR HISTORY OF ASTRONOMY TO THE YEAR 1500 A.D.—Dr. Felix Müller, of Berlin, has just completed a small volume entitled "Zeittafeln zur Geschichte der Mathemathik, Phisik und Astronomie bis zum Jahre 1500," which will be welcomed by all interested in the very early history of the exact sciences. The book is arranged chronologically and gives a short account of the chief workers in these branches of science up to the year 1500. At the end of each reference a list of the literature likely to be needed is added. The work is published by Messrs. B. G. Teubner, Leipzig.

A LARGE TELESCOPE.—The Americans seem to have made up their minds to be the possessors of the largest telescopes in existence, for in spite of their owning the great Lick Refractor (36-inch) we hear now that the University of Chicago are about to have "the largest and most powerful telescope in the world." This instrument will be the gift of Mr. Charles Jerkes, and will cost half a million dollars. The object-glass will have a diameter of 45 inches and will be made by Messrs. Alvan Clark, of Cambridge, Mass.

THE ATMOSPHERES OF PLANETS.—Of all the planets that revolve round our sun, Jupiter affords the most suitable of them for the study of atmospheric circulation. That his circulation will not be exactly like ours will be at once evident, for not only does the sun pour his rays on his vast surface, but he possesses himself heat, as is suggested by the rapid changes which these cloud masses undergo. A recent hypothesis, explaining the various movements in this planet's atmosphere, has been put forward by Mr. Marsden Manson, in the fifth number (vol. ix.) of the "Transactions of the Technical Society of the Pacific Coast," San Francisco. The chief element which produces these movements is the action of the sun, and it is on this reasoning that he attempts to unravel the laws underlying the circulation in Jupiter's atmosphere. In this pamphlet he first brings together some of the facts relating to our own wind system, which are generally conceded, together with the important results that were gathered from the path taken by the Krakatoa

dust-cloud. The spots observed on Jupiter's surface are next dealt with, a table of their rotation periods and latitudes being included. From the latter he deduces that the mean periods of rotation of matter in the following latitudes are:—

Lat.			h.	m.	s.
12° N.	from 17 N.	Temp. spots	9	55	36·49
4° N.	,, 5 N.	Equat. ,,	9	50	40·06
8° S.	,, 21 S.	Equat. ,,	9	50	22·4
30° S.	,, 3 spots		9	55	17·1

In treating of the spots themselves, he suggests that those which are of a white appearance are gyrating uprushes of warm air from the lower regions, while the dark ones are simply descending columns of cool air, "the two forming parts of the system of vertical circulation." The red spot, he suggests, is caused by a local escape of internal heat, the repellent force it appears to possess being due to the "spreading of the heated currents as they rise." He explains the retardation and acceleration of its period of revolution by the increasing force of the west winds, brought about by the exposure of the southern hemisphere during Jupiter's half-year (5·93 of our years); in this way the spot is sometimes situated over and sometimes to one side of the source of heat underneath. The author also deals with other spots in a similar manner.

GEOGRAPHICAL NOTES.

MR. SVEN HEDIN'S account of his ascent of Mount Demavend is published in the last number of the *Verhandlungen* of the Berlin Geographical Society. Demavend is a volcanic peak rising abruptly from the sedimentary rocks of the parallel Elburz chains. Starting from the village of Ranah on the south-eastern slope with two guides on July 10, 1890, Hedin reached the summit on the afternoon of the next day. On the summit a large elliptical crater was found; the edges of which were strewn with blocks of porphyritic lava and sulphur. After discussing the aneroid and boiling point observations, Mr. Hedin arrived at 5465 metres (17,930 feet) as the height of the summit. This is lower than any of twelve earlier estimates which are cited, the highest of them being 6559 metres.

THE Italian possession of Eritrea on the coast of the Red Sea gives some promise of becoming useful agriculturally. Several small settlements of Italians on the plateau have succeeded in growing large crops of wheat and barley, and only the unsettled state of the surrounding natives threatens the prosperity of the farmers. The districts of Oculé-Cusai and Guro are already fully cultivated, and Saraé, as yet almost unoccupied, has fertile land and plenty of room for colonists. The Italians are able to work in climatic conditions which would rapidly exhaust the natives of northern Europe.

THE general summary of Mr. Conway's expedition in the Karakoram range telegraphed from India (p. 525) has now been supplemented by a full narrative, written to the secretaries of the Royal Geographical Society from a camp on the Baltoro Glacier on August 29, with a postscript added at Skardo, on the way to Leh, on September 12. The difficulties of the preliminary journey were very great, not the least being the fording of several swollen glacier streams by a party numbering four Europeans, four sepoys, seventy coolies, an indefinite number of followers, and flocks of goats and sheep. The moraines on the Baltoro glacier were of almost incredible extent; for two-thirds of its entire length the ice is entirely concealed by stones, except where crevasses or lakes occur, and the irregularity of the surface made travelling extremely slow. Mr. Conway limits the name of Godwin-Austen to the highest peak of "K^2," giving to the whole mountain the somewhat cumbrous title of the Watch Tower of India. One branch of the Baltoro Glacier results from the union of seven glaciers from this mass; the larger branch descends from the snow-swathed, throne-shaped mountain, hitherto unmapped, for which the auriferous quartz found in its rocks suggested the name of The Golden Throne. This was fixed upon as the goal to be attained. The first attempt landed the Europeans and Ghoorkas, who made excellent climbers, on Crystal Peak, 20,000 feet in elevation, a peak as hard to climb as the Matterhorn, and isolated from the surrounding higher summits. No inconvenience was felt from the rarity of the air, and the party remained on the summit for an hour and a quarter. In the grand attempt on the Golden Throne serious difficulty was encountered from the terrible extremes of heat and cold. The last few thousand feet proved very exhausting; one of the Ghoorkas had to be left behind, suffering from mountain-sickness. Every step had to be cut in hard ice. Finally the summit was reached at an elevation of 23,000 feet; but the Golden Throne stood revealed much higher, and separated by a deep depression. From the summit of Pioneer Peak, probably the highest yet reached by man, a series of photographic views was obtained and prismatic compass bearings taken to the surrounding features. As long as the party were at rest they felt no discomfort, but the sphygmograph showed that the heart's action was very laboured. A stay of an hour and a quarter was made on the summit, the view from which baffled description. The descent was safely made, but fatigue and bad weather stopped further exploration.

THE INSTITUTION OF MECHANICAL ENGINEERS.

ON the evenings of Wednesday and Thursday of last week, the 26th and 27th ult., an ordinary general meeting of the Institution of Mechanical Engineers was held in the theatre of the Institution of Civil Engineers, by permission of the council of the latter Society. The President, Dr. William Anderson, occupied the chair during the proceedings.

There were two papers on the agenda. The first was the report of the Institution's committee appointed to enquire into the value of the steam jacket. Mr. Henry Davey is the chairman of this committee, and he had prepared the report; which is a bare record of facts without comment, and in this respect is, we think, defective. Numberless experiments have been made in time past as to the value of the steam jacket, and those now added by the labours of the committee do not largely differ from many that have gone before. We take it that the general opinion of competent engineers is that an advantage in efficiency is to be obtained by jacketing engine cylinders in an efficient manner, and cases in which the jacket has not been proved efficient are those in which it has not been properly applied. What was wanted, therefore, was guidance as to the proper method of application, and it is significant that the most help in this direction came, during the discussion, from those who were not members of the committee. Timidity in expressing opinion will be excusably construed as indicating something of incompetence, and if the members are not capable of expressing opinion they are not suitable persons to form a research committee of an important institution. We frame our remarks hypothetically, because, with such names as Unwin, Bryan Donkin, and Mair-Rumley on the title-page, there can be no doubt that the power to afford guidance was present, and for this reason the decision to give only bare fact is the more to be regretted. The general conclusion to be drawn from the experiments, as quoted, is that "the expenditure of a quantity of steam in an efficient jacket produces a saving of a greater quantity in the cylinder." It does not follow from this that the jacket is always desirable, as the saving may be so small as not to justify the additional complication and increased outlay at first cost. That, however, is a matter upon which steam users must themselves decide upon a commercial basis; and is, of course, outside the province of the committee, but what would have been valued would have been some critical remarks giving guidance as to what goes to constitute the "efficient jacket," what fresh engineering practice is opened up by the use of the efficient-jacket, and under what conditions it may be most effectually applied.

The first series of experiments quoted were carried out by Mr. J. G. Mair-Rumley, of the firm of James Simpson and Co., of Pimlico, upon a compound jet-condensing beam pumping-engine. The diameters of the cylinders are 29 inches and 47·5 inches, with strokes of 65·1 and 96 inches respectively. Only the body of each cylinder is jacketed, the steam being supplied direct from the boiler at a pressure of 49lbs. per square inch above atmosphere. Experiments were made both with and without steam in the jackets. The total feed water per indicated horse power per hour when the jackets were not in use was 18·20 lbs., with the jackets in use the corresponding figures were 16·64 lbs., thus showing a percentage of less steam used due to the jackets of 8·6. The quantity of jacket water condensed was 1·20 lbs. per I.H.P. per hour. The boiler pressure here was not high, 49·7 lbs. without and 49 lbs. with jackets.