Mongolian Buryats,[1] are of the genuine Tûrki stock, and speak a pure Tûrki language, though rude and marked by some distinct features.

Touching the numbers and strength of the Turkoman tribes proper, opinions vary considerably. While Behm and Wagner reckon them at no more than 450,000, Vambéry still adheres to the number of one million given in his "Travels in Central Asia," adding that further research may tend to increase, but certainly not to diminish that figure. This estimate is partly borne out by Gen. Obrutcheff,[2] who makes them amount in 1874 altogether to about 930,000, exclusive of the "Eski-Turk" and other scattered members of the family in Asia Minor, North Syria, the Euphrates Valley, and Persia.

In view of recent and pending political events, the subjoined list of the Turkoman tribes with their localities and approximate numbers may be acceptable:—

	Tribe.	Population.	Locality.
Tekke	Akhal	300,000	N. slopes Kuren-dagh and on Tejend River (Lower Heri-rûd).
	Merv		Merv Oasis.
	Goklan	55,000	Upper Atrek, Gurgan, and Simbur, and in Mazanderan.
Yomut	Atabai	135,000	S.E. Coast Caspian, eastwards to Kizil-Arvat, and on Lower Oxus below Khiva.
	Jaffarbai ...		
	Ersari	300,000	Left bank Oxus, about Charjui; hence called "Lebâb" or "River" Turkomans.
	Al-Ili	15,000	Between Oxus and Afghan frontier.
	Chaudor	30,000?	Ust Urt plateau, east from N. end Caspian.
	Salor	20,000	About the Murghâb between Merv and Herat.
	Sarik	40,000	Merv Oasis.
	Sakar	10,000	About Sarakhs.
	Essen-Ili	115,000	South from the Chaudor.
	Amr-Ili.....	15,000	About Middle Oxus.
	Ui and Aimak	7,500	N. frontier Hazarajat.
	Kara Dashli...	7,500	
	Kozanli.....	20,000	Kozen Dagh (Taurus).
	Pekmeshli...	30,000	Euphrates Valley and N. Syria.
	Genkani ...		
	Kecheli.....		
	Bejeli		
	Rehanli.....		
		1,100,000	

The discrepancy between this estimate and that of Obrutcheff is due to the fact that in the above list are included the Turkoman nomads of Asiatic Turkey, besides a large branch of the Goklans, some 8,000 families, now settled in Mazanderan.

A. H. KEANE

DISCOVERY OF A GASEOUS NEBULA

THE Rev. T. W. Webb writes as follows to the *Times* on the subject of Lord Lindsay's letter in NATURE last week:—

On the night of November 14, while sweeping in the constellation Cygnus with a low power on my 9·38 inch silvered speculum by With, I perceived an object resembling, but not quite identical with, a bluish 9 magnitude star. The use of higher magnifiers at once detected the existence of an ill-defined bright disk, subtending about 4″, and surrounded perhaps with a slight amount of glow. It has since been identified at other observatories as No. 4,004 in Argelander, + 41, the place for 1880 being R.A., 21h. 2m. 31s.; D., + 41° 45′·3. Through the kindness of Dr. Copeland, by whom it has been carefully examined under the greatest instrumental advantages at Lord Lindsay's observatory at Dunecht, North Britain, I am enabled to add the following interesting particulars. It is not circular, and has a sharp nucleus near the north-preceding edge, with a faint effusion of light in the opposite direction. Three very measurable bright lines were found in a powerful spectroscope, of which the positions, as given by two sets of measures, were respectively 500·1, 495·7, 487·0, and 500·1, 495·6, 486·0. When these values are compared with those deduced by D'Arrest from the results of several observers of known objects of this nature—500·4, 495·7, 486·1—there can be no remaining doubt that the object in question is of the very interesting and mysterious class termed planetary, or, more correctly, gaseous nebulæ. Dr. Copeland assigns 8, 5, and 1, as the approximate intensities of these lines, reckoning from the least refrangible direction. It can occasion no surprise that its true characters should have escaped the piercing and practised gaze of Argelander, as it would require a much larger instrument than that which he employed to give any intimation of its nature.

A NEW PLANETARIUM

SIGNOR N. PERINI, of Garrick Chambers, Garrick Street, has invented a planetarium, which, so far as we are aware is in all respects superior to, more *vraisemblable* than, any apparatus of the kind hitherto attempted. The structure, for such it really is, consists first of a hemispherical dome, fourteen feet in diameter at the base and the same in height, resting on twelve columns. Getting underneath the dome, one sees the vault overhead coloured so as to represent the starry sky, with the milky way and the constellations in their proper places. Suspended from the top by a narrow hollow rod is an opal globe lit up by gas or electricity to represent the sun, and around this, at their proper proportional distances, are suspended by almost invisible wires, the planets from Mercury to Uranus. By a slight turn of a key Signor Perini sets the solar system in motion, when the sun revolves on its axis, and all the planets in their proper *elliptical* orbits and at their proper axial inclination, and with proportionate velocity. Saturn has his rings and the other planets their moons; the earth, about the size of a walnut, by a mechanism peculiar to itself, revolves on its axis at a rate accurately proportioned, the same mechanism causing the moon, a small pearl, to revolve round the earth in its own proper orbit. Round the base of the dome the various signs of the zodiac are indicated, and the paths of the planets are shown by ellipses traced around the vault. The spectator is supposed to be standing somewhere underneath the solar system, and the general effect is very striking. To us it seems the most effective method hitherto devised to convey to old or young a realistic conception of the arrangement and motions of the planets. During the working of the mechanism not a sound is heard, though above the dome, and concealed from view is an elaborate arrangement of machinery. This machinery is of the nature of clockwork, with, however, a special feature by means of which the elliptical motions of the planets are effected. Inside the earth is a watchwork arrangement, which could easily be adapted to the other planets were it not for the expense. When wound the machinery can be kept going continuously for upwards of five hours; it can be stopped at any moment. The invention has, we believe, cost Signor Perini seven years' unremitting work and seven hundred pounds expenditure. We believe that the work has all been done

[1] "Le nom de Bouroute leur est absolument inconnu" (Ch. de Ujfalvy in *Bul. de la Soc. de Géographie* for June, 1878).
[2] In the Russian statistical work, "Sbornik," iii. p. 80.

at night and during early morning hours, as the inventor has to give his daytime to his profession of teacher. Signor Perini informs us that he could without difficulty make his planetarium as large as the Albert Hall and small enough to become a school apparatus for teaching. He showed us a table, like a small writing-table, between the tops of which he had arranged his machinery on a small scale to give motion to a tellurium which he fits on to the table. Of course the invention, as indeed Signor Perini admits, may be capable of improvements in detail, but as it stands it seems to us a triumph of ingenuity and determined perseverance, for which its inventor deserves the highest credit.

A MICROSCOPIC SERENADE[1]

O COME, my love, and seek with me
A realm by grosser eye unseen,
Where fairer forms will welcome thee,
And dainty creatures hail thee queen.
In silent pools the tube I'll ply,
Where green conferva-threads lie curled,
And proudly bring to thy bright eye
The trophies of the protist world.

We'll rouse the stentor from his lair,
And gaze into the cyclops' eye;
In chara and nitella hair
The protoplasmic stream descry,
Forever weaving to and fro
With faint molecular melody;
And curious rotifers I'll show,
And graceful vorticellidæ.

Where melicertæ ply their craft
We'll watch the playful water-bear,
And no envenomed hydra's shaft
Shall mar our peaceful pleasure there;
But while we whisper love's sweet tale
We'll trace, with sympathetic art,
Within the embryonic snail
The growing rudimental heart.

Where rolls the volvox sphere of green,
And plastids move in Brownian dance,—
If, wandering 'mid that gentle scene,
Two fond amœbæ shall perchance
Be changed to one beneath our sight
By process of biocrasis,
We'll recognise, with rare delight,
A type of our prospective bliss.

O dearer thou by far to me
In thy sweet maidenly estate
Than any seventy-fifth could be,
Of aperture however great!
Come, go with me, and we will stray
Through realm by grosser eye unseen,
Where protophytes shall homage pay,
And protozoa hail thee queen.

JACOB F. HENRICI

[1] From *Scribner's Monthly Magazine* for November.

JOHN ALLAN BROUN

IT is only a few weeks ago that it became our painful duty to record the untimely death of a distinguished mathematical and experimental physicist, and we have now to mourn the loss of one equally distinguished in observational inquiry. John Allan Broun was born at Dumfries, where his father had, we believe, a normal school especially intended for young men about to enter the navy. Upon the death of his father, Mr. Broun, then about twenty years of age, went to the University of Edinburgh, and speedily became a successful student in more than one branch of knowledge. But his strongest attachment was always to physical science, and the late James D. Forbes, who was at that time Professor of Natural Philosophy at Edinburgh, considered Mr. Broun as one of his very best pupils. A friendship was thus formed which lasted through life.

About 1842 the scientific world began to perceive the necessity of conducting cosmical inquiries, and Sir Thomas McDougal Brisbane, in the most generous manner, agreed to establish and maintain a magnetical observatory at his residence at Makerstoun. Prof. Forbes had thus the opportunity of recommending his pupil, Mr. Broun, to Sir Thomas, who gave him the directorship of his observatory. In this capacity he continued to reside at Makerstoun for some years, where the delight of pursuing an occupation congenial to his tastes was enhanced by the great pleasure he derived from the society of Sir Thomas Brisbane, and of his amiable family, and their loss one after another was a very severe trial to him. It was no slight task to superintend an institution such as this in a branch of science then comparatively new, and Mr. Broun laboured so hard at his duties that he began to have palpitation of the heart, caused, probably, by his constant night watches. In consequence of this he obtained as his assistant Mr. John Welsh, who became one of his warmest friends, and who afterwards, as Director of the Kew Observatory, won for himself a high reputation in the course of a life that was, unhappily, very short.

Mr. Broun left Makerstoun in 1850 and went to Paris, where he formed the acquaintance of the lady who was afterwards his wife, Isaline Vallouy, the daughter of a clergyman in the Canton du Vaud, and belonging to an old Protestant family of Dauphiné (du val Louise) who had fled from France at the Revolution. This lady is now left to mourn his loss. From this marriage he had three sons and two daughters. Of his sons one is an architect, one has just left this country to enter upon his duties as civil servant in the North-West Provinces of India, while another, in preparation for the Indian forest department, is finishing his studies at Nancy. In 1851, through the influence of his friend, Col. Sykes, Mr. Broun was appointed director of the Trevandrum Observatory, an institution supported by His Highness the Rajah of Travancore, and he left this country for India in the same year. Of the scientific value of his work in India we will speak later on; but we may remark that it was