

present report, however, achieves novelty is in the production, at suitable temperatures, of not only a good yield of tar, but also an excellent production of gas and of sulphate of ammonia. It has commonly been considered that a good gas make indicates a low oil production, and *vice versa*. The Department, however, by means of a compromise on temperature and by various modifications of standard gas-works technique, has, without doubt, made a distinct step in the direction of producing ample supplies of fuel oil compatible with the maintenance of the gas output.

In a communication to the Journal of the Röntgen Society, vol. xiv., No. 54, January, 1918, Mr. C. A. Schunck describes a series of tests made to ascertain the region of the ultra-violet spectrum that produces the greatest therapeutic effect. The several parts of the spectrum were isolated by the absorption of weak solutions of quinine sulphate, salicylic acid, and phenol, or by glass plates. The therapeutic effect was observed by exposure of the operator's forearm to the screened rays for definite periods of time, and note was taken of the reaction produced. The greatest effect appears in the region 2500 to 2350 Å.U.; the boundaries, however, of this region are not sharply marked.

Engineering of May 31 contains an account of the new Tröllhattan Canal, connecting Lake Vänern with the Kattegat. Sanctioned by a Parliamentary vote in May, 1909, the waterway in October, 1916, had reached a stage which enabled it to be opened to traffic, and the ceremony was performed by the King of Sweden. The project is really one of old standing, dating back to the days of Gustavus Vasa, who initiated steps for linking up Lake Vänern with Tröllhattan by means of a navigable waterway. The first lock was opened in 1607. It was not, however, until 1800 that through connection was established to Gothenburg. Various extensions have since been carried out, culminating in the development called the new canal, the cost of which has somewhat exceeded a million and a quarter sterling. The enlarged waterway, which is fifty-two miles in length, is adapted for vessels generally up to 13 ft. draught, but the locks, which are six in number, enabling a change in level of 140 ft. to be negotiated, are constructed to pass vessels of 16½ ft. draught, this being a provision to meet likely developments in the near future. Each of the lock-chambers has a length of 320 ft. and a width of 45 ft., with a depth of 18 ft. of water over sill. The canal has a mean bottom width of 79 ft. The traffic during last year amounted in the aggregate to 9759 vessels, totalling 870,668 tons. Of this number 7827 were steamers, 664 sailing vessels, and 1268 barges. The undertaking was designed and carried out under the direction of the Royal Waterfalls Board.

OUR ASTRONOMICAL COLUMN.

KODAIKANAL OBSERVATORY REPORT.—The report of the Director of the Kodaikanal Observatory for the year 1917 has been received. The weather during the year was generally unfavourable, according to Indian standards, but substantial progress in many departments of solar research is recorded. Direct photographs of the sun were obtained on 294 days, monochromatic images of the disc in K light on 328 days, prominence plates on 262 days, and H_α disc plates on 255 days. Judging by the mean latitude of spots, it would appear that the maximum of the sunspot cycle was not reached, though the northern hemisphere may possibly have attained its greatest activity.

NO. 2537, VOL. 101]

The prominences, with a mean daily number of 19.8, were in excess of those recorded in 1916; the northern hemisphere continued to be more active than the southern, as regards both prominences and spots, and also as shown by prominences projected as absorption markings on the disc. Work with the large grating-spectrograph included the spectrum of Venus (see *NATURE*, vol. ci., p. 192), sun and arc comparison spectra, and the spectrographic determination of the solar rotation, in addition to experimental work on the "pole effect" in the iron arc. It has been found that most of the iron arc lines in the region between 4337 and 4494 show a tendency to shift towards the red with increasing exposure time, indicating that they are unsymmetrically widened towards the red to a very slight degree. The vertical motion-shift of 3 km./sec. reported by Perot for the B group of oxygen (telluric lines) was not confirmed by observations made at Kodaikanal. An attempt to photograph the conjunction of Regulus and the sun on August 22, in infra-red light, was unsuccessful, but the sky was not sufficiently clear to give a satisfactory test of the method. Time determinations and meteorological and seismological observations were also carried on.

ANNUARIO OF THE RIO DE JANEIRO OBSERVATORY.—The thirty-fourth issue of this useful almanac of 524 pages fully maintains the high standard of previous years. It is divided into four sections, dealing respectively with astronomical data for 1918, a collection of tables for the reduction of astronomical observations, geophysics and climatology, and a summary of meteorological observations made at thirty-three stations in Brazil. It is interesting to note that the tables include details of the corrections to be applied to the tabulated times of rising and setting of the sun and moon in order to obtain the corresponding data for other parts of the country; the inclusion of such data in our own official almanac would doubtless be generally welcomed. Since 1660 the magnetic declination at Rio de Janeiro has varied from 12° E. to its present value of about 11° W., and may be approximately represented by a formula given by the director of the observatory, Dr. H. Morize, namely, $d = 5.6^\circ + 0.08^\circ t + 8.0^\circ \sin(0.73^\circ t - 44.1^\circ)$, where t is the interval in years from 1850 taken as zero.

ALEXANDER THE GREAT AND HIS CELESTIAL JOURNEY.

PHOTOGRAPHS were given in *NATURE* of August 23, 1917, and March 14, 1918, of traditional representations of Alexander, seated in a car drawn by flying griffins, from St. Mark's, Venice, and Bâle Cathedral, and it was conjectured that a diligent hunt would reveal many similar examples in Europe and England. Since then an article by Prof. R. S. Loomis has appeared in the *Burlington Magazine* of April and May, which shows that the author had been engaged already in a research on the subject of Alexander's celestial journey. Prof. Loomis gives copious references to earlier authorities, with the addition of more than a score of photographs of other examples of the representation, in which we are pleased to find some ten are taken from English churches and cathedrals, as Wells, Chester, Lincoln, Gloucester (surely Canterbury), and Beverley Minster, Cartmel Priory, Whalley Church, St. Mary's Darlington, and Charney Bassett, Berks.

The figure of Alexander can be recognised by the two spears he carries in his hands, baited at the end with a tasty lure to guide the griffins alongside to bear him aloft. They are not sceptres, or distaffs even, in the mistake of the local designation (Borgo-

San-Donino) of the subject as "Berta che filava"; and chains are shown as traces to harness the griffins. The detail of the mosaic pavement, A.D. 1165, in Otranto Cathedral bears the name Alexander, to prove there is no doubt of the subject.



FIG. 1.—Detail of mosaic pavement, A.D. 1165, Otranto Cathedral. From the *Burlington Magazine*.

In "Dynamics of Mechanical Flight" (1912) I have given, on p. 7, a vignette representation from an English MS. in the British Museum, bearing a strong resemblance to the Tournay tapestry in Fig. O of Prof. Loomis's article. The subject was thus evidently a favourite as familiar to readers of medieval romance.



Photo

(G. C. Druce.

FIG. 2.—Detail, about A.D. 1345, from Gloucester Cathedral. From the *Burlington Magazine*.

Prof. Loomis tells us (p. 136) that the story of Alexander the Great is not to be found in the earliest body of romantic Alexander tradition of the Greek Pseudo-Callisthenes, but must be considered a late medieval or Renaissance interpolation. But no mention of this can be found in the edition by Carolus Müller, 1846, in the Reading Room of the British Museum, where the Greek version of the Pseudo-Callisthenes is given in chap. xli., book ii., p. 91.

The legend was familiar to Chaucer, from the reference to it in his "House of Fame":—

for never halfe so hye as this
N'as Alexander of Macedon
King—ne of Rome dan Scipion,
That saw in dreame at point devise,
Heaven and Earth, Hell and Paradise,

Ne eke the wretch Dedalus,
Ne his childe nice Icharus
That flew so hie that the hete
His wyngs molte, and he fel wete
In midde the sea, and there he dreint.
For whom was made a great complaint.

Chaucer returns to it in "The Squieres Tale," alluded to by Milton as the one—

that left half told
The story of Cambuscan bo'ld
And of the wondrous steed of brass
On which the Tartar king did ride—

the subject of the Scribe-Auber opera of "The Bronze Horse" ("Le Cheval de Bronze") in the Tartar-Chinese legend. In the Chinese euphemism the Emperor is said to mount the dragon when he ascends to heaven.

Prof. Loomis traces Greek inspiration in the bas-relief on St. Mark's, and conjectures it was brought from elsewhere as a trophy of war. Later ages, he tells us, identified Alexander with Antichrist and Lucifer, for his impious experiment and scientific research.

Here is an opportunity to rectify the omission of the interpretation of the line in the ode to Archytas (NATURE, March 14),

animoque rotundum percurrisse polum,

as a reference to another of the mathematical textbooks of Horace's schooldays, the treatise of Archytas on Spherics, what we call the Use of the Globes, a study highly commended by Lord Kelvin for its stimulus.

G. GREENHILL.

THE VISIT OF DELEGATES FROM ITALIAN UNIVERSITIES.

IF the British Government in courteously inviting a delegation from the Italian universities to make a tour of England and Scotland in order to inspect the higher educational institutions of the United Kingdom had as its purpose to show to the Italians to what an extent the war had exercised an influence on national studies, and how far the students had participated in the work of military preparation and in the risks of the war, certainly that purpose was fully achieved. The Italian professors, welcomed in the historic university towns and in the other centres of knowledge with the utmost kindness, found the halls and colleges empty and transformed into barracks for troops. It is precisely the same in Italy, where, except for the medical students, who have been sent back from the front in order to complete their studies, the schools have been practically closed. Among the Italian professors and students the killed and wounded are numerous. It has always been a tradition of the educated youth of Italy to lend its aid to national movements, and in the present war the first sign of the decision of Italy to intervene with those who are now our Allies was given by the university classes, either as active participators in the work of government or as members of the body of students.

But the Italian professors had yet another mandate, that, namely, of making themselves acquainted with the course of education in Great Britain and of comparing it with that of their own country. However the external forms of the various English universities may differ among themselves, and differ from ours, we have found that, after all, the founda-