2. A road from the present terminus of surveys on the Bloemfontein-Ladybrand Railroad (Thaba Nchu), through Modderpoort to Ficksburg.

3. A track from Fauresmith to Koffyfontein.

The former surveys of the roads Harrismith-Bethlehem-Heilbron, Belfast-Lydenburg, and Pretoria to Rustenburg are already in hand. The survey from Fauresmith to Koffyfontein is an extension of the existing railroad from Springfontein to Fauresmith on which the track has not yet been laid.

The branch from Machadodorp to Ermelo, which was under construction by a company before the war, is to be completed by the company at its convenience. The earthworks were well advanced when work had to be stopped.

There are numerous other extensions well in hand, but in several instances, where the roads were commenced before the war broke out, and conflict with the latest arrangements or existing roads, they are in a state of chaos. This is notably the case with the Silati Railroad. The extension from Pietersburg toward Rhodesia via Tuli, is liable to be objected to by both the Cape and Rhodesian Railroads, and unless union of the schemes is effected such an extension would probably divert much traffic from the two last named. It is not considered advisable to construct any such roads through districts already adequately supplied with railroad facilities. The government is going to relay the whole of the main railroad through the Orange River Colony with 80-pound metal rails to allow the use of heavier and more powerful locomotives, and thus increase the train loads. A comprehensive system of light railroads connecting the main road to outlying districts is to be carried out to facilitate transport. A branch from Bloemfontein to Thaba Nchu will probably be completed in about six weeks, and it is the intention eventually to continue it to Ficksburg.

The new direct line from Vereeniging to Langlaagte or the West Rand, upon which the heaviest types of locomotives are to be used to enable heavy loads to be drawn, will probably be one of the first to be completed as soon as labor is available. All the embankments, etc., were constructed during the war, except about ten miles near the center, in a district then occupied by the enemy. The survey of these ten miles is to be proceeded with at once. In connection with this direct railroad the "coal road" along the reef will be completed, and also the sidings into the mines, involving the laying of some forty-five miles of track, chiefly in the sidings.

THE THREE HUNDREDTH ANNIVERSARY OF OXFORD'S BODLEIAN LIBRARY.

On October 8 and 9 the University of Oxford celebrated the three hundredth anniversary of its famous Bodleian. When it was first opened, November 8, 1602, in the building erected in 1487-8 over the Divinity School, by Humphrey, Duke of Gloucester, the library contained only 2,000 books. The Bodleian had its comparatively humble origin in the bequest by Bishop Cobham, of Worcester, of some books, for which was built in the later years of the fourteenth century a little room in an annex to St. Mary's Church. About a hundred years later, Humphrey, of Gloucester, who seems to have been a kind of Mæcenas, gave books and manuscripts to the university, which were only too zealously destroyed by the fanatical anti-Popery commissioners of Edward VI.

Sir Thomas Bodley, after whom the library was named, was born in Exeter in 1545. His father, John Bodley, on Mary's accession, fled to Geneva, where his son attended lectures on Hebrew and Greek, as well as those of Beza and Calvin on divinity. After the death of Mary the family returned to England and Thomas entered Magdalen College, Oxford, in 1563. He was elected Fellow of Merton. Entering the diplomatic service, Bodley became Elizabeth's Minister to the Hague. Disappointed by Burghley he retired into private life, resolving, as he tells us, to set up his staff at the library door in Oxford, and to restore that place, then in a pitiful state of ruin, to the public use of students. In order to accomplish this purpose he began the establishment of a library in 1598, using as a nucleus the few books of Duke Humphrey and Roger Lisle which had escaped the ravages of Edward VI.'s commissioners. In four years Bodley collected and catalogued about 2,000 volumes. Walter Raleigh and other friends aided him. Bodley induced the Stationers' Company, in 1610, to send to Oxford a copy of every work which they printed. Out of his own pocket he paid for a third story to the "Schools;" but he never lived to see the fulfillment of his labors. In his will he provided for the endowment and maintenance of the library.

In 1639 the Abbot of Osney, Thomas Huskenorton, reduced the public schools into one building. Archbishop Laud, John Selden, the Earl of Pembroke and Sir Kenelm Digby ranked among the earlier benefactors of the library. To the contents of the Bodleian have been added, during the last three centuries, the statues given in 1755 by the Countess Dowager of Pomfret, antique marbles presented by Selden's executors, and the inscribed marbles gathered by Thomas, Earl of Arundel, at his house in the Strand, London, which his grandson, Thomas, Duke of Norfolk, persuaded by Evelyn, gave in 1667 to the University. Of interest are also the Gough (topography and MSS., 1799), Ballard, Wood, Rawlinson, Malone, Douce and Sutherland collections. The auctarium on the chief stairway is reserved for the choicest books and illuminated MSS. Many rare portraits are to be found in the old library. The picture gallery contains Fouquet's models of ancient buildings; Allan Ramsay's portrait of Flora Macdonald, painted in 1749; portraits of Mary Queen of Scots, and Sir Kenelm Digby; some splendid busts, and the brass statue executed by Hubert Le Sœur from designs by Rubens of William, Earl of Pembroke. In an apartment known as the "Old School," may be found the Hope collection of 200,000 books and engraved portraits. So largely has the number of volumes increased that the printed books alone amount to nearly 600,000 in number, while the manuscripts number about 28,000, and so overwhelming has been the overflow that the contents of the adjacent Radcliffe were transferred forty years ago to the University museum in order to make room. The modern books have been removed into the Radcliffe, which is now called the "Camera Bodleiana."

AN EXAMPLE OF WIRELESS TELEGRAPHY'S EFFICIENCY.

A very adequate idea of the utility of the Marconi wireless telegraphic invention, and the wide and beneficial influence it will exercise from a commercial point of view, in connection with vessels engaged in the transatlantic traffic, was afforded recently by the log of the Cunard liner "Campania" on a round voyage from Liverpool to New York and back. The "Campania" left Liverpool at 4:30 P. M. on Saturday, August 30, and remained in communication until 6:10 P. M. with the same company's steamer "Ivernia," also fitted with the Marconi system, which was lying in the Huskisson Dock, Liverpool. From 7:05 to 8 P. M. she was in communication with the homeward-bound "Umbria" in the Mersey Channel. At 8:30 Holyhead was signaled, followed by Rosslere station at the southeast corner of Ireland until 3 A. M. on Sunday, August 31. Passengers and mails were embarked at Queenstown, and the ship sailed at 10:15 A. M. on Sunday, August 31. She was then in communication with Crookhaven from 11:40 A. M. until 3:15 P. M. At 1:35 A. M. on September 3 she came into communication with the homeward-bound "Lucania" and exchanged messages with her for some time. At 4:45 P. M. on September 5 she signaled Nantucket lightship, and continued in communication until 8:30 P. M. At 11:30 P. M. Sagaponack station replied to her call, and continued talking until 1:40 A. M. the next day, when she was abreast of Fire Island, distant about 60 miles, and the new station at Babylon, north of Fire Island, came into communication about the same time as Sagaponack ceased. She kept in touch with the latter until Sandy Hook lightship was passed at 3:18 A. M.

On the homeward passage the "Campania" left New York on September 13 and was in communication with the "Umbria," which was just arriving at that port between quarantine and dock. She then got in touch with the Babylon station at 7:40 P. M., and continued until 1:40 P. M. Then Sagaponack station followed. She next communicated with the inward-bound "Lucania" on September 16 at 11 P. M. and continued until 1:40 A. M. on the following day. On the 17th she conversed with the Atlantic Transport vessel "Minnehaha" for some hours. The Cunard homeward-bound "Saxonia" was signaled at 2:50 P. M. on the 18th, when she was 36 miles ahead of the "Campania," and the two steamers were in communication until the evening, when the "Saxonia" was 100 miles astern. Crookhaven was signaled on the 19th at 8:45 A. M. and conversation was maintained until 11:40 A. M. The "Campania" arrived at Queenstown at 12:50 A. M. on the same day.

From this log it will be seen that it is practically possible to cross the Atlantic, and to remain in communication with the land all the way across via various ships, which can act as retransmitting stations. If all the vessels plying between this country and Europe were similarly equipped with the Marconi apparatus, it would be possible for a man to remain *au courant* with home or the commercial world the whole of the five or six days' sea passage.

SUCCESSFUL TEST OF A TOWER ELEVATOR.

An experimental four-hundred foot drop of the Philadelphia City Hall tower elevator recently proved that the safety air cushion device installed will probably prevent any serious accident. Within the short distance of 84 feet the speed of the car was reduced from 2½ miles a minute to zero. In the car were placed eggs, delicate incandescent light bulbs and rats. When the car reached the bottom most of the eggs were found in good condition, the incandescent light bulbs were intact and the rats alive and well. The trip was made directly under the Penn statue, 372 feet 9 inches above the bottom of the shaft. The particular safety device used is the Ellithorpe safety air cushion.

SCIENCE NOTES.

In order to encourage the study of science among women, the Association for Promoting Scientific Research Among Women has offered two prizes of $1000 each for the best papers prepared by women. One is for the best work based on independent laboratory research in biological, chemical or physical science, and the other on any scientific study. The chairman of the prize committee is Miss Ellen H. Richards, of the Massachusetts Institute of Technology, Boston.

The United States Coast and Geodetic Survey has published a very handsome and serviceable map showing the lines of equal magnetic declination and of equal annual change in the United States for 1902. The lines of equal magnetic declination or isogonic lines are given for every degree and are based on a new observation up to July 1, 1902. The lines of equal annual change of the magnetic declination pass through all the lines where the annual change is of the same amount.

A woful cry is going up from the representatives of all the ologies, and one hears nothing but a doleful wail about shrinking incomes and curtailing of operations. Take the Palestine exploration fund, for example. Here the secretary laments a decrease of the society's income by nearly one-third within the past three or four years, and he attributes this in a great part to the war, the absence of so many of the most influential and wealthy officers and the corresponding anxiety of their families.

It is generally believed that the bite of sea serpents, or hydrophids, is not dangerous, but this is not so, and cases of death from this cause have been observed by Comtor in Japan, Fayrer in India, and Forné in New Caledonia. M. Kermorgant has published some new observations in the Annales d'Hygiene et de Medecine Coloniales. The geographical distribution of the sea serpents is very extensive, embracing a marine zone which is bounded on one side by the coasts of Asia and Africa and on the other by the west coast of Central America; Australia is included in this region. The species are numerous and they are all dangerous. These include the *Hydrophis nigra* and *H. nigrocyneta*, of the Indian Ocean and the seas of China; the *H. chloris*, of the Indian Ocean, also the *H. cyanocyneta*, as well as the *Pelamys bicolor* of the Australian coast. If the effects of their bite have not been more often pointed out it is because they are not mortal in a great number of cases. In many of the colonies of New Caledonia these serpents are found in abundance, and the opinion is so general that they are harmless that the snake charmers use them in their performances. In fact, they bite but rarely and with difficulty owing to the smallness of their mouth, and the dangerous effects are not frequent as they have only very small venom-glands and minute fangs. The head, which is small, is scarcely to be distinguished from the body, while the tail is flattened in the form of an oar. The length often exceeds three feet. A rat, when bitten by one of these serpents, dies in four or five minutes.

H. Rieder reports a continuation of the experiments begun by him in 1898 relative to bactericidal power of Röntgen rays. The bactericidal power of the Röntgen rays was tested against the cholera spirillum, the bacillus prodigiosus and the colon bacillus. The micro-organisms were inoculated into gelatine or agar and exposed to the action of the rays in Petri dishes, the covers being removed. After twenty to thirty minutes' continuous exposure to the rays many of the bacteria were killed, and multiplication ceased in nearly all. In every series of experiments, however, a few of the individual bacteria were not affected. Experiments have shown that the bactericidal power of the rays is not due to the fluorescent light, heat, ozone or electricity. So far as is known the culture media are not altered by the rays or made unsuitable for the growth of bacteria. Gelatine is never liquefied. It is not, however, to be assumed on the basis of the above experiments that the Röntgen rays possess any bactericidal action upon bacteria when present in the animal body. The evidence from animal experimentation is against such a supposition. As a rule, animals inoculated with pathogenic bacteria and exposed to the rays die sooner than similarly inoculated animals which are not thus exposed. It is not to be denied that in the human subject certain infectious diseases, particularly those of the skin, may be successfully treated by the Röntgen rays, but it does not seem probable, at the present time that such success is due to bactericidal action.

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