

therefore, that the bird fauna of arctic America originated in this region.

A number of species inhabiting the tundras are derived from the southern Palearctic, most likely from the modern Kirgiz steppes; their dispersion took place probably along the Turgaisk-Barabinsk plains.

It follows, therefore, that the arctic bird fauna is derived from two distinct centres, namely, eastern Siberia and the region of the Bering Sea. The species derived from eastern Siberia spread throughout the palearctic; only a limited number reached America. The arctic fauna of America and some species found in extreme eastern Siberia have been derived from the region of the Bering Sea.

The other centres of lesser importance where certain arctic species originated and whence they spread are the coast-line of the Atlantic Ocean and Central Eurasia, probably the modern Kirgiz steppes. The Atlantic bird fauna was formed on the Atlantic coast-line simultaneously with the spreading farther north of warm ocean currents, and from there it spread over the neighbouring continents. The immigrants from southern Eurasia spread through far-eastern Siberia, which they reached by way of the west Siberian plains.

Forestry Research in India.

THE recent announcement in the *Times* of Nov. 8, that the Viceroy, accompanied by Lady Irwin, had opened at Dehra Dun the new Government Forest Research Institute, the largest in the British Empire, if not in the world, is of considerable interest. Early in 1926 it was announced that the Finance Committee of the Legislative Assembly had sanctioned a sum of £833,000 to be spent on the Research Institute. This announcement was discussed in NATURE (Feb. 6, 1926, p. 204). The new buildings just opened by the Viceroy are stated to have cost the sum of £850,000.

Dehra Dun has been the centre of forest education since 1878, when a training college for rangers and foresters was established. Towards the end of 1900 the first research work by the Forest Department was commenced, when a member of the forest staff was appointed for two years as forest entomologist to the Government of India with headquarters at Dehra Dun. This appointment was renewed in 1904, the same officer taking up the post. The question of the formation of a Research Institute was then taken up actively, the sympathy and support of Lord Curzon, the Viceroy, was secured, and the Research Institute with a sanctioned staff, but without adequate buildings or equipment, came into being in 1906.

The new department expanded rapidly and the first Institute buildings were opened in 1914. The War brought about a great opportunity and created a demand for the maximum utilisation of all kinds of Indian forest products. The buildings, deemed adequate in 1911, proved far too small, and the Industrial Commission of 1918 strongly urged the need for extending the Research Institute, its equipment and staff. Effect was given to this suggestion. The Government of India took up an area of 1200 acres of land on the outskirts of Dehra. The Central Institute, with separate buildings for mills, workshops for sawing, testing, and seasoning timber, laboratories, offices, and residences for the staff, are now complete. The main Institute building, with its already splendidly developed series of museums and its library and laboratories, is 1024 feet long and 285 feet wide, and has two stories, Indian timbers

having been largely used in construction work, paneling, etc.

Preparatory to the completion of the building, the Government of India appointed a committee of business men to review the organisation of the Institute and to make recommendations for the maximum efficiency in its work. The committee reported very favourably in July last, and the Government has already discussed the proposals with the Inspector-General of Forests, Mr. A. Rodger. The latter warmly praised the recommendations of the committee. The Viceroy, in opening the new buildings, also paid a tribute to the work of the committee, and after describing some of the fine work already accomplished by the Research Institute, stated that the Government intended, within the limits of its financial liability, to give the Institute the scientific staff which it requires.

See also note on p. 840 of this volume.

University and Educational Intelligence.

CAMBRIDGE.—The Adam Smith Prize has been awarded to R. F. Kahn, King's College, for an essay entitled "The Economics of the Short Period".

The Clerk Maxwell Scholarship for the advancement by original research of experimental physics, of the value of £210 a year for three years, has been divided equally between Mr. W. H. Watson, research student of Gonville and Caius College, and Dr. W. L. Webster, of Trinity College.

Mr. Sydney Goldstein, Smith's Prizeman 1927, Isaac Newton Student in the University 1927-28, has been elected into a fellowship at St. John's College.

LONDON.—The following doctorates have been conferred: D.Sc. in chemistry on Mr. H. J. Emeléus (Imperial College—Royal College of Science), for a thesis entitled "The Glow of Phosphorus and Allied Phenomena"; and on Mr. I. Vogel (Imperial College—Royal College of Science), for a thesis entitled "Carbon Rings"; D.Sc. in medical and vital statistics on Mr. A. B. Hill (London School of Hygiene and Tropical Medicine), for a thesis entitled "An Investigation of Sickness in various Industrial Occupations"; D.Sc. (Engineering) on Mr. M. A. Hogan (Imperial College—City and Guilds College), for a thesis entitled "The Support of Underground Workings in Coal Mines"; D.Sc. (Engineering) in metallurgy on Mr. J. M. Robertson (Imperial College—Royal School of Mines), for a thesis entitled "The Effect of Variations in the Rate of Cooling on the Microstructure and Constitution of Steel".

The Sir John William Lubbock Memorial Scholarship Prize in mathematics, of the value of £30, has been awarded to Miss I. W. Busbridge, of Royal Holloway College.

READING.—Mr. James R. Matthews, lecturer in botany at the University of Edinburgh, has been appointed to be professor of botany in succession to Dr. W. Stiles, now professor of botany at the University of Birmingham.

THE Wigan and District Mining and Technical College, founded in 1857, gives particulars in its new and enlarged Calendar of the buildings opened for it last June by Lord Chelmsford. Their erection was made possible by grants amounting to £37,000, including £5000 for equipment, from the Miners' Welfare Fund. It is now in a position to offer full-time university degree courses in mining, engineering, chemistry, and general science, as well as in commerce and art.

WE have recently received the Calendar of the Heriot-Watt College, Edinburgh, which provides day and evening instruction in mechanical, electrical, mining, and oil engineering, applied chemistry, brewing, pharmacy, building, printing, commerce, and languages. It is closely associated with the University of Edinburgh, and its courses form an essential part of the training of students for the University's degrees in civil, mechanical, and electrical engineering, mining and metallurgy, and technical chemistry. The mine rescue station for Mid and East Lothian is a portion of its mining department. Continuation classes in the south-east of Scotland, affiliated with its classes, are conducted by city and county education authorities.

THE Council of University College, Cardiff, has executed a new agreement with the Cardiff Royal Infirmary regarding the Welsh National School of Medicine, and the School is therefore re-opening for students in the clinical departments this session. A joint Appointments Committee, on which the students are represented, has been set up by the Council and Senate. A course in general science, shared between all the departments of pure science and open to the public, has been arranged for the current session. Recent appointments include the following: Prof. J. F. Rees, to be principal in succession to Dr. A. H. Trow (retired); Mr. C. N. Strong to be lecturer and demonstrator in anatomy; Mr. J. B. Duguid to be acting professor of pathology and bacteriology.

"PROGRESS of Education in India, 1922-27", by R. Littlehailes, Educational Commissioner with the Government of India (Calcutta, Govt. of India Central Publication Branch, vol. 1, R. 1.10 or 2s. 9d., vol. 2, Rs. 2.10 or 4s. 9d.) is a review of noteworthy interest. This interest is the greater for the almost simultaneous publication of the report of Sir Philip Hartog's auxiliary committee appointed by the Simon Commission to present a review of the same subject (without limitation to the quinquennial period) in relation to political and constitutional conditions and potentialities of progress. This Committee's report directs special attention to the claims of girls' education, to which priority should, it says, now be given in every scheme of expansion. In this matter Mr. Littlehailes declares that the belief that "the education of women is essential to national advancement" is now widespread in India and holds that, in spite of many formidable obstacles, the outlook is brighter to-day than at any previous period. In sections on universities and intermediate education he traces the history of the attempts made to give effect to the policies advocated by the Calcutta University Commission's report of 1919. The separation of the intermediate classes (first half of the usual four years' course of higher education) from the university and the transfer of their work to 'intermediate colleges' would not, it is held, be academically sound without extension of the B.A. course from two to three years, and such extension is economically unacceptable if not impossible; the only provincial government prepared to accept the proposed separation is that of the United Provinces. The devolution policy of the constitutional reforms introduced in January 1921, with the transfer of responsibility for education from the Government of India to provincial governments, and the recent increase in the number and varieties of universities, has rendered increasingly difficult for outsiders the intelligent appreciation of Indian educational problems and especially university problems. Mr. Littlehailes' chapters on administration and control and on universities and colleges afford valuable help towards overcoming these difficulties.

No. 3133, VOL. 124]

Calendar of Patent Records.

November 17, 1884.—The foundation of the artificial silk industry was laid by Count Hilaire de Chardonnet, who patented his cellulose-nitrate process in France on Nov. 17, 1884. A factory was set up at Besançon, and manufacture started in 1891, and though Chardonnet's process has been outdistanced by the cheaper viscose method of production, the growth of the industry has been continuous from that time. Sir Joseph Swan's artificial thread of 1883 was used only for electric lamp filaments, and was not taken up for textiles.

November 18, 1820.—The first successful calculating machine to be manufactured on a commercial scale was patented in France by Franz Xavier Thomas on Nov. 18, 1820. The adoption of the machine was slow for many years, but by the middle of the century it was being manufactured in large quantities, and machines of the same type are still being made to-day. An original Thomas machine is in the Deutsches Museum at Munich.

November 20, 1772.—The Birmingham 'papier-maché' industry was founded by Henry Clay and was based on the patent granted to him on Nov. 20, 1772, for a process of making decorative panels, tea-trays, etc., by pasting sheets of paper together, and japanning or lacquering them. The term 'papier-maché', which had been used many years before in its real sense for articles made from moulded paper-pulp, was not applied to the articles made by the Clay process until the middle of the nineteenth century.

November 20, 1813.—The introduction of the vacuum-pan into the sugar manufacturing process—one of the most important inventions in the history of the sugar industry—was due to Charles Edward Howard, who was granted a patent for it on Nov. 20, 1813.

November 20, 1832.—The fusee match was patented by Samuel Jones of London on Nov. 20, 1832. The first friction matches were produced by John Walker of Newcastle-on-Tyne in 1826, but his invention was not patented and the fusee patent is the first for a friction match to appear in the records. Jones was the patentee also of the 'Promethean' match, one of the chemical 'instantaneous light' contrivances which preceded the friction match, and he also, in 1829, introduced the 'Lucifer', which was, however, only a copy of Walker's.

November 21, 1777.—The patent granted to Robert Stodart on Nov. 21, 1777, for "a new sort of instrument or grand forte-piano with an octave swell, and to produce various tones together or separate, which instrument will be more durable and produce finer and more variable tones than any yet made" supplies the first instance of the use of the term 'grand piano'.

November 21, 1833.—A needle-pointing machine which cuts off a length of wire sufficient for two needles, sharpens both ends, punches the eyes, and severs the wire into the two completed needles, was patented by Daniel Ledsam and William Jones on Nov. 21, 1833. Probably the machine never came into use. Apparatus of the kind was first used in Germany; its adoption in England came much later.

November 21, 1839.—The first superheater for locomotives—consisting of a chamber in the upper part of the smoke box heated by the furnace gases on their way to the chimney—was patented by Robert and William Hawthorn on Nov. 21, 1839, and was fitted to an engine supplied to the Newcastle and North Shields Railway in 1840. The locomotive superheater did not, however, come into general use until the introduction of the Schmidt fire-tube construction at the beginning of the present century.