subaerial erosion only, and regards this as a natural consequence of the massiveness and relative rigidity of the ice streams. The valleys are comparatively straight, with broad floors and rather smooth and steep sides, heading in amphitheaters or corries that seem unduly large for their drainage areas. The valley floors frequently descend by abrupt slopes to lower and lower levels. Rock basins, excavated in the valley floors, and holding lakes, are justly regarded as subordinate and incidental to the general scouring of the shallower and narrower preglacial valleys to their present trough-like form. Short side glens open characteristically on the walls of the larger valleys to which they are tributary. The divides between the uppermost corries of the main valleys are sharply serrate, in consequence of the retrogressive erosion of the glaciers that headed in the corries, as has been pointed out by Richter for the Alps, and by Matthes for the Big Horn range of the Rocky mountains.

The comparison instituted by Harker between rivers and glaciers is not altogether satisfactory inasmuch as it fails to point out certain similarities between the two. It is stated that, 'the bed of a river which has attained a mature state maintains a steady gradient so long as the volume of water is unchanged'; but it is the surface, not the bed, of the river that should be thus described. The bed of a mature river, such as the Mississippi, has numerous hollows, whose dimensions are to those of the river in about the same proportion as the dimensions of rock basins are to those of the glaciers that scoured them out. When a mature river crosses a reef of resistant rocks, it habitually sweeps out a shallow basin-like depression in the weaker rocks next up stream; while another basin may be eroded by the plunge of the waters down stream from the reef. Rivers whose volume is greatly reduced in the dry season exhibit the hollows in their bed as a series of pools strung together by the diminished stream. It therefore seems wrong to say that 'ice erosion does not, like water erosion, work constantly towards the establishment of an even gradient along a valley.' Both tend to establish even gradients in their surface; both produce inequalities in their beds; the inequalities of a river bed receive little attention; they are comparatively small and are usually out of sight; the inequalities in the beds of existing glaciers are even less open to observation, although it can hardly be doubted that they exist. The inequalities in the beds of extinct glaciers are often so large and so plainly visible that their analogy with the hollows in river beds is too commonly overlooked.

THE SEVERN BORE.

A SERIES of views of the Severn bore taken with a bioscope camera by Vaughan Cornish was thrown on the screen at a meeting of the Royal Geographical Society of London in November last, the first cinematographic illustration of this tidal phenomenon. Four of the views are reproduced in the *Geographical Journal* for January, 1902, and show the approach and passage of the bore with some distinctness. Cornish proposes to make similar studies of other tidal rivers. His well-known studies of rippled sands, under waves, tides and winds have been published in recent years.

W. M. DAVIS.

RETIREMENT OF MONSIEUR HATON.

THE report of the proceedings at a meeting of the faculty, alumni and friends of M. Haton de la Goupilliére on the occasion of his retirement from the directorship of l'Ecole nationale supérieure des Mines, accepting Vice-Presidency of the Conseil général des Mines is just distributed. This ceremony took place June 8, 1901, in the great auditorium of the Société d'Encouragement. The list of contributors numbered 580 and the farewell offerings were numerous and various, including a bust of M. Haton and bronzes by Dubois and others. The bust is reported to have proved a very accurate likeness of its distinguished original. The addresses were made by M. Carnot, Director of the Ecole des Mines, and M. Lemonnier, president of the Association.

M. Haton was 'Élève ingénieur' in 1852, when about 20 years of age, was made professor in the preparatory course immediately on graduation as Ingénieur, taught general

chemistry in 1855 and mathematics pure and applied; in 1872 he became professor in the course then including machines and exploitation of mines, and became director of the School of Mines in 1887, where he remained until the end of the XIXth century, nearly a half-century of continuous service, substantially all at l'Ecole des Mines. His principal works had meantime been published, on 'Mines and Mining' and on 'Thermodynamics and Motor-Machines.' He had been called to serve on several international juries, and on various commissions, and had earned many honors, including that of Member of the Institute in 1884 and of 'grand-officier' of the Legion of Honor in 1900.

In replying to the cordial and eloquent addresses of MM. Carnot and Lemonnier, M. Haton stated that alumni of the school had supplied 39 members of the Institute and 8 'Correspondents':

"Hommes d'action, hardis explorateurs, chez de grandes industries, ingénieurs chargés de la conduite des travaux ou des affaires, ils soutiennent dans le monde entier le bon renom de l'École."

The *Compte Rendu,* as its frontispiece, has an excellent portrait of M. Haton de la Goupillière. It indicates that its original retains his youth and vigor wonderfully and we may hope for him many more years of active, fruitful and honorable life. His friends in this country will cordially unite with those about him in wishing for him 'many happy new years.' R. H. Thurston.

SCIENTIFIC NOTES AND NEWS.

Professor E. C. Pickering has completed twenty-five years of service as director of the Harvard College Observatory, and in recognition of the fact the staff of the Observatory has presented him with a silver cup.

The condition of Professor Rudolf Virchow, who recently suffered an injury from a fall, causes apprehension to his physicians.

Dr. W. W. Keen, who is at present in India, recently fell from his horse, fracturing one of his clavicles. The accident was not serious.

The daily papers state that President Roosevelt has overruled the decision of Secretary Long to send Capt. Charles H. Davis, superintendent of the Naval Observatory, to sea.

Dr. Henry B. Kümmel was appointed state geologist of New Jersey by the board of managers of the Geological Survey at their meeting on January 10. Mr. Kümmel has been connected with the Survey since 1892, and since 1899 has been assistant state geologist, being in charge of the work since Dr. Smock's resignation last July. He is a graduate of Beloit College, A.B. 1889, and did post-graduate work in geology at Harvard University, and the University of Chicago, from which he received the degrees of A.M. and Ph.D. respectively. He was elected a fellow of the Geological Society of America in 1895.

Samuel McCune Lindsay, assistant professor of sociology in the University of Pennsylvania, has been nominated for Commissioner of Education in Porto Rico.

The Paris Academy of Medicine has awarded its Hugo prize of $200 for the best work on the history of medicine to Dr. Melanie Lapinska for her book on the history of women physicians.

Dr. Charles H. Burnett, a well-known writer on diseases of the ear, died at Bryn Mawr, Pa., on January 30, aged sixty-one years.

Lieutenant von Siegsfeld, after a balloon ascension from Potsdam to study artificial respiration, was killed in the descent.

The American Philosophical Society, Philadelphia, has arranged for a general meeting on April 3 and 4, and a large number of scientific men from all parts of the country have signified their intention of being present. Members wishing to present papers are asked to communicate the titles to the secretaries without delay, so that they may be inserted in the preliminary program which will be issued as soon after February 15 as practicable. Members expecting to attend the meeting are requested to notify the secretaries at as early a date as possible so as to facilitate the arrangements for their entertainment.

The 'Leopoldinisch-Carolinische Akademie deutscher Naturforscher,' now in Halle, cele-