atmosphere favours or hinders the work of bees. The summers of 1889 and 1890 are cited as presenting a marked contrast with regard to both beet-sugar and honey, in correspondence with weather-conditions; the earlier year was a highly prosperous one, the latter quite the opposite.

IN the Report, just issued, of the U.S. Commission of Fish and Fisheries, on the fisheries of the great American lakes in 1885, it is noted that in Lake Michigan there is no fishing through the ice in the southern end of the lake, but that in the northern end, especially in Green Bay and along the north shore, this fishery is extensive. For twenty years it has given employment to a very large number of men living in the neighbourhood of Green Bay, and many fishermen from other localities have found work there during the winter months. During the winter season the bay used to present greater activity than the surrounding land, hundreds of shanties and temporary huts being built for shelter. Dealers drove about from place to place on the ice to purchase the catch, and merchants sent waggons with provisions for the fishermen. At the height of the season it was not uncommon for the fishermen to bring their families out to the fishing quarters, where they would remain for some weeks, all hands helping to keep the nets in repair. For several years this fishery, owing to the diminished quantity of white-fish, has been less extensive, and the fishermen engaged in it at present generally live at home, owning a horse and sleigh, which enable them to visit their nets daily.

AT a recent meeting of the Field Naturalists' Club of Victoria, Baron von Mueller advocated strongly the protection of insectivorous and native birds in the colony. He thought that this object might be attained, not only by putting a comparatively heavy tax upon guns and by more strictly enforcing the present laws, but by the initiation of some scheme which would enlist the sympathy and co-operation of all persons interested in the subject. He suggested that a distinctive badge might be worn by members if such a union were ever formed.

THE Académie Royale des Sciences, des Lettres, et des Beaux Arts de Belgique has issued its *Annuaire* for 1892. It contains, besides much information as to the organization and activity of the Academy, biographical sketches of deceased members, with remarkably good portraits.

AN interesting memoir is contributed by Dr. Merz, of Zurich, to the current number of the *Berichte*, concerning the compound of nitrogen and magnesium, generally known as magnesium nitride, Mg_3N_2. Magnesium, like boron, appears to possess a somewhat powerful affinity for nitrogen. Some years ago Deville and Caron, during their distillations of magnesium for the purpose of obtaining the pure metal, observed the presence of small transpar ent crystals, containing only magnesium and nitrogen, upon the surface of the distilled metal. More recently, Briegleb and Geuther have shown that nitride of magnesium in an amorphous form may be prepared by heating magnesium filings in a porcelain boat placed within a porcelain tube traversed by a stream of nitrogen. Dr. Merz now describes two extremely simple methods of obtaining the nitride, suitable for lecture demonstration, and also some further properties of this interesting substance. A quantity of finely-powdered and carefully dried magnesium, about two grams in weight, is placed in a wide piece of combustion tubing about twenty centimetres long, closed at one end. Attached to the open end of this tube by means of a wide caoutchouc connection is a narrower tube closed by a caoutchouc stopper, through which passes the nitrogen delivery tube. A short side-tube blown upon the narrower tube carrying the stopper serves for the exit of the gas, and is connected by narrow caoutchouc tubing with a long vertical tube bent round parallel to itself, the open end of which dips beneath the surface of some coloured water. The air is first displaced from the whole apparatus by means of pure dry nitrogen, and when this is accomplished, the combustion tube containing the magnesium, laid nearly horizontally, is heated by means of a triple Bunsen burner. After two or three minutes have elapsed from the attainment of a red heat, the speed of the current of nitrogen may be slackened by means of a screw clip placed somewhere in its path, when the coloured water will rapidly rise in the vertical tube, attaining a height of ten feet, if the tube is so long, in a couple of minutes, thus exhibiting in a graphic manner the rapid absorption of the nitrogen by the magnesium. On allowing the experiment to proceed for upwards of an hour, almost the whole of the magnesium is converted to nitride, the small remainder reacting with the glass, and producing a black mirror of silicon. Magnesium nitride obtained by this method is a light, voluminous, friable, and yellowish-gray-coloured substance when cold, but reddish-brown while hot. When exposed to the air, it smells strongly of ammonia, owing to its decomposition by the moisture present. When a little water is poured upon it, great rise of temperature occurs, together with hissing, increase in volume, and evolution of steam, just as when quicklime is slaked. Ammonia is also evolved in large quantities, and white magnesium hydrate remains. The decomposition by means of water is most effective when performed at the bottom of a large flask, which rapidly becomes filled with ammonia gas; the moment a little hydrochloric acid is introduced upon a feather or other convenient carrier, the flask becomes filled with dense fumes of ammonium chloride. Dr. Merz further shows that the nitride may likewise be obtained by heating magnesium in a current of dry ammonia to a temperature considerably lower than that which is required in the case of free nitrogen, and very much lower than that employed by Briegleb and Geuther in some similar experiments made by them. As soon as this temperature is attained, a brilliant incandescence occurs, and the flame may be removed; hydrogen is evolved in a rapid stream, and 95 per cent. of the magnesium is converted in three or four minutes to nitride.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus* ♂), a Sooty Mangabey (*Cercocebus fuliginosus* ♀) from West Africa, presented by Canon Taylor Smith; a Moustache Monkey (*Cercopithecus cephus* ♂) from West Africa, presented by Mr. Alfred Lloyd; a Silver-backed Fox (*Canis chama*) from Damaraland, South Africa, presented by Mr. E. Aubrey Hart; two Virginian Opossums (*Didelphys virginiana*) from North America, presented by Mr. John Brinsmead, F.Z.S.; a Common Jay (*Garrulus glandarius*), British, presented by Mr. Charles Faulkner; a Great Titmouse (*Parus major*), a Coal Titmouse (*Parus ater*), a Blue Titmouse (*Parus cæruleus*), British, presented by Captain Salvin; a Bonham's Partridge (*Ammoperdix bonhami*) from Western Asia, deposited; a Bronze-winged Pigeon (*Phaps chalcoptera* ♀) from Australia, purchased.

OUR ASTRONOMICAL COLUMN.

MOTION OF STARS IN THE LINE OF SIGHT.—Prof. H. C. Vogel, in *Monthly Notices R.A.S.* for December 1891, fully describes the method used at Potsdam for determining the velocity of stars in the line of sight, and states the chief results that have been obtained since the work was begun in 1887. In order to insure great stability with the smallest possible weight, the frame of the spectroscope is made of cast steel. The camera is also constructed of steel, and the dark slides are of brass. It may be worth remarking, however, in this connection, that stability would have been secured if aluminium had been used instead of steel and brass, and this with a little more than one-third the weight. A spectroscope similar to Prof. Vogel's, but

with an aluminium frame, has been made for the Observatory at Kensington, and gives every satisfaction. The comparison spectrum used at Potsdam has been furnished by a Geissler tube placed directly in the cone of rays of the refractor, at a distance of 40 cm. from the slit, the tube being at right angles to the optical axis of the refractor and the slit. The slit is set parallel to the line of the diurnal motion, and width is given to the spectrum by making the driving-clock move slightly slower or faster than its proper rate. A uniform exposure of one hour has been employed, the proper intensity being obtained by changing the rate of the driving-clock, so that the error increases with increase of brightness. The photographs are measured with the aid of a microscope having a sliding apparatus on its table, movable by a fine micrometer screw. One revolution of the screw corresponds to a difference of wave-length of 0·324 $\mu\mu$, which, expressed in miles per second, is 139·13. After describing the methods of measuring the displacement of lines in stars of different types of spectra, Prof. Vogel brings together the results which have formed the subject of several previous communications. It is said that the probable error in the determination of the radial velocity of a star of Class II. is ± 1·34 miles per second, and for stars of Class I., ± 2·31 miles. Measurements have been made independently by Prof. Vogel and Dr. Scheiner, and each star has been observed on the average 3·3 times, wherefore it is concluded "that the probable error of the definitive values for both spectral classes will amount to less than one mile." A list of the observed velocities of forty-seven stars will soon be published. The mean motion in the line of sight is 10·6 English miles per second; six stars have a velocity less than 2 miles per second, and five greater than 20 miles. α Tauri heads the list with a velocity of about + 36 miles per second. Fifteen of the stars have a positive, and thirty-two a negative motion.

ORTHOCHROMATIC PLATES FOR ASTRONOMICAL PHOTOGRAPHY.—MM. Fabre and Andoyer photographed the eclipsed moon at Toulouse Observatory on November 13, 1891; and some of the pictures obtained were exhibited by them at the meeting of the Paris Academy of January 11, with a note on the method of production. Collodion-bromide and collodion-chloride plates were employed, both kinds being treated with eosin and cyanin to render them orthochromatic. The former kind of plate was found to be relatively more sensitive to red and yellow rays than the latter, although both were stained with the same dyes. It is proposed, therefore, to use collodion-bromide orthochromatic plates to obtain photographs of Mars, Jupiter and the red spot, and coloured stars.

DREDGING OPERATIONS IN THE EASTERN PACIFIC.

THE *Bulletin* of the Museum of Comparative Zoology at Harvard College, published in June, contains three letters from Prof. Alexander Agassiz to the Hon. Marshall McDonald, United States Commissioner of Fish and Fisheries, on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California. The operations, which were in charge of Prof. Agassiz, were carried on by the U.S. Fish Commission steamer *Albatross*, Lieutenant Commander Z. L. Tanner, U.S.N., commanding.

I.

Steamer "Albatross," Panama, U.S. of Colombia, March 14, 1891.

MY DEAR COLONEL MCDONALD,—We returned yesterday from our first trip. The route extended from Panama to Point Mala, and next to Cocos Island; from there we ran in a southerly direction, then north-westerly to Malpelo Island, and back to the hundred-fathom line off the Bay of Panama. We spent several days trawling off the continental plateau of the Bay. This trip being rather in the nature of a feeler, I cannot tell you just what I think it means. But I believe I can to some extent conjecture probabilities from what has been accomplished.

I have found, in the first place, a great many of my old West Indian friends. In nearly all the groups of marine forms among the Fishes, Crustacea, Worms, Mollusks, Echinoderms, and Polyps, we have found familiar West Indian types or east coast forms, and have also found quite a number of forms whose wide geographical distribution was already known, and is now extended to the Eastern Pacific. This was naturally to be expected from the fact that the district we are exploring is practically a new field, nothing having been done except what the *Albatross* herself has accomplished along the west coast of North and South America. The *Challenger*, as you will remember, came from Japan to the Sandwich Islands, and from there south across to Juan Fernandez, leaving, as it were, a huge field, of which we are attacking the middle wedge. As far as we have gone, it seems very evident that, even in deep water, there is on this west coast of Central America a considerable fauna which finds its parallel in the West Indies, and recalls the pre-Cretaceous times when the Caribbean Sea was practically a bay of the Pacific. There are, indeed, a number of genera in the deep water, and to some extent also in the shallower depths, which show far greater affinity with the Pacific than with the Atlantic fauna. Of course, further exploration may show that some of these genera are simply genera of a wider geographical distribution; but I think a sufficiently large portion of the deep-sea fauna will still attest the former connection of the Pacific and the Atlantic.

I am thus far somewhat disappointed in the richness of the deep sea fauna in the Panamic district. It certainly does not compare with that of the West Indian or Eastern United States side. I have little doubt that this comparative poverty is due to the absence of a great oceanic current like the Gulf Stream, bringing with it on its surface a large amount of food which serves to supply the deep-sea fauna along its course. In the regions we have explored up to this time, currents from the north and from the south meet, and then are diverted to a westerly direction, forming a sort of current doldrums, turning west or east or south or north according to the direction of the prevailing wind. The amount of food which these currents carry is small compared with that drifting along the course of the Gulf Stream. I was also greatly surprised at the poverty of the surface fauna. Except on one occasion, when, during a calm, we passed through a large field of floating surface material, we usually encountered very little. It is composed mainly of Salpæ, Doliolum, Sagittas, and a few Siphonophores—a striking contrast to the wealth of the surface fauna to be met with in a calm day in the Gulf of Mexico, near the Tortugas, or in the main current of the Gulf Stream as it sweeps by the Florida Reef or the Cuban coast near Havana. We also found great difficulty in trawling, owing to the considerable irregularities of the bottom. When trawling from north to south, we seemed to cut across submarine ridges, and it was only while trawling from east to west that we generally maintained a fairly uniform depth. During the first cruise we made nearly fifty hauls of the trawl, and, in addition, several stations were occupied in trawling at intermediate depths. In my dredgings in the Gulf of Mexico, off the West Indies, and in the Caribbean, my attention had already been called to the immense amount of vegetable matter dredged up from a depth of over 1500 fathoms, on the lee side of the West Indian Islands. But in none of the dredgings we made on the Atlantic side of the Isthmus did we come upon such masses of decomposed vegetable matter as we found on this expedition. There was hardly a haul taken which did not supply a large quantity of water-logged wood, and more or less fresh twigs, leaves, seeds, and fruits, in all possible stages of decomposition. This was especially noteworthy in the line from the mainland to Cocos Island, and certainly offers a very practical object-lesson regarding the manner in which that island must have received its vegetable products. It is only about 275 miles from the mainland, and its flora, so similar to that of the adjacent coast, tells its own story. Malpelo, on the contrary, which is an inaccessible rock with vertical sides, and destitute of any soil formed from the disintegration of the rocks, has remained comparatively barren, in spite of its closer proximity to the mainland.

The most interesting things we have found up to this time are representatives of the Ceratias group of Fishes, which the naturalists of the *Albatross* tell me they have not met before on the west coast of North America. The Crustacea have supplied us with a most remarkable type of the Willemoesia group. The paucity of Mollusks, and also of Echini, is most striking, although we brought up in one of the hauls numerous fragments of what must have been a gigantic species of Cystechinus, which I hope I may reconstruct. We were also fortunate enough to find a single specimen of Calamocrinus off Morro Puercos, in 700 fathoms, a part of the stem with the base,