My "segregate fecundity" and Mr. Romanes's "physiological selection" are the same principle; and our theories still further correspond in that we both insist on the prevention of intercrossing as a necessary condition for divergent evolution. This conclusion was reached by me through investigations made many years ago, and was maintained in my paper on "Diversity of Evolution under One Set of External Conditions," and in still stronger language in articles in the *Chrysanthemum* (Yokohama), January 1883, and in the *Chinese Recorder* (Shanghai), July 1885. In the first of these papers I used the word "separation" to indicate the phase of the principle that results from migration; but for a fuller discussion of the subject I found it necessary to introduce "segregation" as the more significant term; and in the second paper I maintain that "While external conditions have power to winnow out whatever forms are least fitted to survive, there will usually remain a number of varieties equally fitted to survive; and that, through the law of segregation constantly operating, ... these varieties continue to diverge till separate species are fully established, though the conditions are the same throughout the whole area occupied by the diverging forms;" and in the third paper I said, "I am prepared to show that there is a law of segregation rising out of the very nature of organic activities, bringing together those similarly endowed," and causing "the division of the survivors of one stock, occupying one country, into forms differing more and more widely from each other." Since then, my nomenclature of the subject has been worked out with that word as the central symbol of my theory. It is therefore a pleasure to find that Mr. Romanes uses the same word to express the same general idea, giving to his theory the alternate name of "segregation of the fit" (Linnean Society's Journ.—Zool., vol. xix. pp. 354, 395), and in one place at least describing it as "physiological segregation" (see letter on "Physiological Selection," NATURE, vol. xxxiv. p. 408).

As I have explained in chapter iv., I at first thought of using "physiological segregation" in place of "industrial segregation," but finally concluded that it was a term of such wide significance that it could not be well used as the name of any one kind of segregation, while at the same time it was not broad enough to serve as a general term for all kinds. I therefore greatly prefer the term "segregation of the fit." I would, however, so define it as to cover all forms of segregation.

Though our use of this fundamental word is undoubtedly due to our having the same general truth to express, several divergences appear in the development of our respective theories, tending, we may hope, to a fuller elucidation of the subject.

26 Concession, Osaka, Japan. JOHN T. GULICK.

Alpine Haze.

THE peculiar haze mentioned by Prof. Tyndall is no doubt identical with what is commonly met with in some parts of the Mediterranean. During the hottest and driest weather of the summer, and when no wind is blowing, perfectly horizontal strata of haze can be seen occupying the Gulf of Naples. The peaks of the Sorrentine Mountains, with Solara of Capri, Ischia, Vesuvius, Camaldoli, &c., stand out above this haze. The height of the strata rarely reaches 2000 feet, and is more often about 1500 feet. The same facts that led Prof. Tyndall to consider it other than water vapour, and of micro-organic nature, had produced in my mind similar conclusions. This haze, when looked at near the sea, has often a beautiful pink tint, due, no doubt, to a complementary effect from the sea-water colour, as the colour is more marked on the limestone rocks, where the white sea-bottom makes the water look much greener When, however, the observer is cut off from a view of the green sea for some time, the haze has then a light buff colour. The opacity of this haze is so great as sometimes to resemble a slight London fog.

Anyone who would count the number and study the characters of the organisms and other solid contents of the air here at different times would soon settle the question what this phenomenon is due to, and whether there is any truth in the old *blight*. H. J. JOHNSTON-LAVIS.

Naples, November 4.

The Astronomical Observatory of Pekin.

IN your number of November 8 (p. 46), you gave an account of a lecture by Mr. S. M. Russell, of Pekin, on the instruments in the old Observatory there. May I mention that the late Alex. Wylie, about nine or ten years ago, published a full account of them (with illustrations) in the "Travaux de la 3me Session du Congrès International des Orientalistes," vol. ii. Having had my attention drawn to them by some photographs kindly sent me by Mr. Russell, I pointed out the scientific interest of Ko Show-King's instruments (which anticipated the ideas of Tycho Brahe by three hundred years), in a paper published in the Proceedings of the Royal Irish Academy, vol. iii., 1881, and in *Copernicus*, vol. i. J. L. E. DREYER.

Armagh Observatory, November 12.

AN HISTORICAL AND DESCRIPTIVE LIST OF SOME DOUBLE STARS SUSPECTED TO VARY IN LIGHT.

THE light-changes of double stars are, for the most part, of an intermittent character. Unmistakable at one epoch, they may completely evade detection at another. Hence observations of them which, by the nature of the case, cannot be repeated are apt to incur discredit for lack of confirmation. They should, on the contrary, if properly authenticated, be carefully borne in mind, as testifying to an incident in the history of the stars they refer to which, however apparently isolated, must be extremely liable to recur. We have therefore thought that it would be useful to put together, as concisely as possible, a few facts bearing on the supposed variability of some stars which we may reasonably consider to be physically double, referring those of our readers who desire fuller information on the subject to the original authorities we shall cite for their convenience.

γ Virginis = Σ 1670.—The first observation is by Bradley in 1718. The components, normally of the third magnitude, were regarded as equal by all observers until W. Struve, May 3, 1818, noticed the preceding star as slightly the fainter. It continued so for several years; the difference was obliterated from 1825–31, and reversed, doubtfully 1832–33, certainly in 1834 ("Mensuræ Micrometricæ," pp. lxxii. 4). O. Struve's observations, 1840–74, showed decided variability in a double period, oscillations of half a magnitude in a few days being superposed upon a fluctuation extending over many years. An investigation of the law of change, begun in 1851, led to no result, owing to the low altitude of these stars at Pulkowa ("Obs. de Poulkova," ix. 122). Dawes found them equal, 1840–47; but each alternately about a quarter of a magnitude brighter than the other, 1847–54 (Memoirs R. Astr. Soc., xxxv. 217–19). Similar swayings of lustre were constantly apparent to Dembowski (*Astr. Nach.*, Nos. 1111, 1185, 1979). Each star is given as of 3·5 magnitude (combined 2·8) in the "Harvard Photometry" (see also "Harvard Annals," xiv. 454). Gould assigns to them the combined magnitude of 3·1, Pritchard of 2·67; Gore thought them nearer to the second than to the third magnitude, April 5, 1883 ("Cat. of Suspected Variables," p. 362). (The combined magnitude of two third magnitude stars is 2·25.) Owing to their uncertainty of shining, the angle has often been reversed in measuring these stars. They are of a pale yellow colour, and show a spectrum of the Sirian type. They revolve in a highly eccentric orbit in a period of 180 years, and emit fully sixteen times as much light proportionately to their mass, as the sun.

44 (*i*) Boötis = Σ 1909—On June 16, 1819, Struve noted a difference of two magnitudes between the components; of one invariably 1822–33, but of only half a magnitude 1833–38. Argelander found them exactly equal, June 6, 1830 ("Mens. Microm.," p. lxxii.). To Dawes, in April 1841, the attendant star seemed a shade brighter than its primary, which was rated as of fifth magnitude (Mems. R. A. Soc., xxxv. 232). Dunér's observations at Lund, 1868–75, confirm their relative variability, causing the disparity between them to range from 0·4 to 1·3 magnitude; and he points out that they appeared to Herschel consider-

ably unequal in 1781, but perfectly matched in 1787. Both stars were yellow in 1875, but the tint of the smaller was at times less deep than at others ("Mésures Microm.," 1876, p. 74). Admiral Smyth marked it as "lucid gray" in 1842; Webb and Secchi respectively found it blue in 1850 and 1859; Webb and Engelmann reddish in 1856 and 1865. The principal star has often been considered as pure white. The spectrum belongs to Class I. The photographic magnitudes of the pair, as determined at Paris in 1886, are 5·3 and 6. Engelmann concluded the smaller component to vary from magnitude 5 to 7, the larger from 5 to 6 (*Astr. Nach.*, No. 1676). They revolve in a period of 261 years, the plane of their orbit passing nearly through the sun. The periastron passage was in 1783. They possess at least four times the solar luminous intensity.

δ Cygni = Σ 2579.—The chief star remains steadily of the third magnitude; its companion varies probably from the seventh to about the ninth. Discovered by Herschel in 1783, it was invisible to him in 1802 and 1804, as well as to his son in 1823, and to South and Gambart, under exceptionally favourable conditions, in 1825 (Phil. Trans., cxiv. 339, cxvi. 376). Struve re-detected it in 1826, since when it has been continuously observed. The fact of its variability has even been doubted (Dunér, "Mésures Microm.," 1876, p. 118; Sadler, *Observatory*, ix. 307). Its changes of colour are, however, unquestionable. Struve marked it as ashen gray, 1826–33, but as remarkably red in 1836 ("Mens. Microm.," p. 297). Dawes found it blue, 1839–41; Secchi, red, 1856·62, blue, 1856·98, violet, 1857·53 (Engelmann, *Astr. Nach.*, No. 1676). Dunér saw it always red, except on one occasion, when it seemed olive. The primary is of a greenish white, and exhibits a Sirian spectrum. The period of 415 years attributed to the pair by Behrmann is probably too long; Hind's, of 179 years, is certainly too short. With Behrmann's elements, the light-power relative to mass comes out *one hundred times* that of the sun.

The three couples just described are the only variable double stars of which the orbits have been computed. We shall now mention a few which have so far described arcs too small to serve as the bases for investigations of the complete ellipses.

ζ Boötis = Σ 1865.—The following component was found the brighter by Herschel in 1796, and by Struve, in general, until 1833, when the order was reversed. They were pretty equal 1821–24 (Pickering, "Harvard Annals," xiv. 458). Their alternating fluctuations were confirmed by O. Struve's observations, 1840–63, since when, until 1878, the preceding star had always the advantage ("Obs. de Poulkova," ix. 143). F. Strüve estimated their magnitudes at 3·5, 3·9, adding the remark, "Splendor in altera stella est variabilis" ("Mens. Microm.," p. 21). Their photometric magnitudes were determined at Harvard as 4·4, 4·8, the following star being the brighter. Dawes considered them as equal at 4 or 4·5 magnitude in 1847–48, but each star in turn took a slight lead (Mems. R. A. Soc., xxxv. 229). Dunér noted them sometimes as both of fourth, sometimes as of third magnitude, the changes occurring, as a rule, simultaneously ("Mésures Microm.," p. 68). The colour of these stars is white, or yellowish, and their spectrum well marked of the first type. The period of their revolution must be enormously long, and their mass proportionately small.

π Boötis = Σ 1864.—Gilliss's estimates varied from 4 to 5·6 magnitude for one component, from 5 to 6·7 for the other. Schmidt independently suspected fluctuations (Pickering, "Harvard Annals," xiv. 458). As one object, they were ranked by Abdurrahman Sûfi of fifth, by Lalande of sixth, by Harding, Argelander, and Heis of fourth magnitude. Their combined photometric magnitude was determined at Oxford as 4·1, at Harvard as 4·59. Herschel and South marked them in 1822 "nearly equal" (Phil. Trans., cxiv. 199); Admiral Smyth noted a disparity of 2½ magnitudes ("Cycle," p. 411, Chambers's ed.); and Struve found them of 4·9 and 6 ("Mens. Microm.," p. 97), and they were photographed at Paris as of 5 and 6 magnitudes in 1886. They emit white light of the quality of that of Sirius. An arc of about 4° has been described by the companion since 1781.

ε Arietis = Σ 333.—F. Struve had no doubt of the variability of these stars. His estimates of magnitude ranged from 4·5 to 6·5 for one, from 5 to 6·5 for the other component ("Mens. Microm.," pp. lxxii. 1; Pickering, "Harvard Annals," xiv. 434). Struve in 1827, and Dawes in 1845, found them equal; Secchi recorded a difference of one magnitude in 1855 (Engelmann, *Astr. Nach.*, No. 1676). Measured at Harvard as of 5·2 and 5·5 magnitudes, giving combined magnitude 4·6, they together showed to Piazzi and Bode as a fifth, to Harding as a fourth magnitude star. An arc of 10° has been traversed since 1827 (Crossley, "Hand-book of Double Stars," p. 204). The colour of these stars is white.

S (15) Monocerotis = Σ 950 was discovered by Winnecke in 1867 to vary from 4·9 to 5·4 magnitude in a period of 3d. 10h. 38m. (Gore's "Catalogue," No. 41). A ninth magnitude companion at 2″·8 seems to be in very slow orbital revolution. Struve called their colours green and blue ("Mens. Microm.," p. 65). The spectrum is of the first type.

α Piscium = Σ 202.—The magnitudes of these stars were estimated by F. Struve at 2·8 and 3·9 ("Mens. Microm.," p. 43), by O. Struve at 4 and 5 ("Obs. de Poulkova," ix. 17). Harvard determinations brought them out 4·4 and 5·3, but showed relative variability to the extent of half a magnitude. The larger star has been rated from 2·5 to 5·5 magnitude ("Harvard Annals," xiv. 433), and there is scarcely any doubt that the light of both (which is of the Sirian quality) fluctuates to some extent. The colour of the attendant star changes from blue to ashen olive and tawny (Webb, "Celestial Objects," p. 378, 5th ed.; Flammarion, "Cat. des Étoiles Doubles," p. 12). Slow revolution in a plane nearly coincident with the visual line is probable.

OΣ 256 = Lalande 24098, catalogued at Pulkowa in 1853 as 7 and 7·8 magnitudes at 0″·6, but subsequently found to vary respectively from 7 to 7·8, and from 7 to 8 magnitude. Dembowski thrice noted the preceding star as half a magnitude fainter, while four Pulkowa observations, 1842–61, showed it as much brighter than its companion, equality being twice recorded ("Obs. de Poulkova," ix. 327). Their variability was still more plainly evident by the manner of their occultation, as observed by Mr. Tebbutt, August 22, 1887. Three-fourths of their combined light disappeared instantaneously, leaving the semblance of a "blurred ninth magnitude star," representing, nevertheless, the chief component of recent measures, to be extinguished a little later (*Observatory*, x. 391). The stars have described an arc of 17° since 1842 (Crossley, "Hand-book," p. 287). Their spectrum is given by Von Konkoly as doubtfully of the solar type.

38 Geminorum = Σ 982.—Struve observed differences of lustre ranging from 1·5 to 4 magnitudes ("Mens. Microm.," p. lxxiii.). The inference of variability was ratified by Engelmann (*Astr. Nach.*, No. 1676; "Harvard Annals," xiv. 443). The combined magnitude in the "Harvard Photometry" is 4·8. A spectrum of the Sirian type was registered by Vogel in 1883. Colour-fluctuations seem pretty certain in the small star, which has retrograded 18° since 1782. The system has a common proper motion (Crossley, "Hand-book," p. 233).

Σ 1517.—Struve ranked each member of this close pair as of 7·3 magnitude, with slight alternate superiority ("Mens. Microm.," p. 286). Their variability was confirmed by O. Struve, who estimated their magnitudes at 7 and 7·8. A slow retrograde, and a rapid common proper motion, prove their systemic connection ("Obs. de Poulkova," ix. 106).

The remaining stars on our list are relatively fixed.

Σ 2344.—Magnitudes 8·5 and 10 when first measured by Struve; 8·5 and 12 in 1829, distance = 1″·38. The companion was not again seen until 1835 ("Mens. Microm.," pp. 37, 296). The instability of its light was further attested by its invisibility to Secchi in 1859, to Engelmann in 1865 (Engelmann, *Astr. Nach.*, No. 1674).

Σ 2718.—Components intrinsically equal, but by turns slightly superior. Period of change probably short (Struve, "Mens. Microm.," p. 142).

61 Geminorum.—The brighter component varies from 6 to 7·5 magnitude, the fainter from 9 to seeming extinction (Flammarion, "Les Étoiles," p. 320). The larger star, which is of a deep yellow colour, was recorded by Piazzi as of 7·8, by Heis and Argelander as of sixth magnitude (NATURE, xii. 27; "Harvard Annals," xiv. 445). It was photometrically determined at Harvard as of 5·7 magnitude. Its attendant eluded Webb's search in 1855, Knott's in 1861 and 1871, but was recovered in 1875, when of 12·5 magnitude, by H. Sadler, using a 6½-inch Calver's reflector (Smyth, "Cycle," p. 202; Webb, *Popular Science Review*, xiv. 309). Since these stars are 60″ apart, the probability of their physical connection rests chiefly upon their agreement in exhibiting marked fluctuations of light.

ρ (5) Ophiuchi, described by Admiral Smyth as of 5 and 7·5 magnitudes at 4″; yellow and blue colours ("Cycle," p. 457). But Herschel at the Cape, 1834–37, and Jacob at Madras, 1846, found them exactly equal. Herschel and South in 1824, Secchi in 1856–57, give a difference of one magnitude. Main called them 4 and 4·3, and they were measured at Harvard as 5·3 and 6 magnitudes (Sadler, *Astronomical Register*, xvii. 73; Pickering, "Annals," xiv. 461).

β Scorpii is No. 489 of Gore's "Suspected Variables." F. Struve assigned to the components magnitudes 2 and 4; Pickering, 3 and 5·2, combined, 2·9. J. Herschel found a difference of only one magnitude, Webb of 3½, Gore of 2½ magnitudes (Webb, "Celestial Objects," p. 386; see also NATURE, vol. xxiii. 206, 362). Their colours are yellowish-white and lilac, or (according to Dembowski) ashy green, and they belong to the first spectroscopic class. They are separated by an interval of 14″, but Burnham detected in 1881 a close, faint attendant upon the principal star (Memoirs R. A. Society, xlvii. 193).

θ Serpentis = Σ 2417.—The components are 21″·6 apart, and relatively fixed. Both emit yellowish-white light marked by the Sirian quality of absorption. They were together ranked by Tycho and Bayer as of third magnitude, by Montanari as of fifth, but, with noticeable subsequent brightening (J. Cassini, "Élémens d'Astr.," p. 74). Gould's estimates wavered from 4·1 to 4·6 magnitude, and gave strong evidence of variability in one of the stars ("Uranometria Argentina," p. 322). Gore thinks that its changes may prove to be modelled on those of Algol (Journ. Liverpool Astr. Soc., v. 110). The separate photometric magnitudes registered at Oxford were 3·9 and 4·2; at Harvard, 4·7 and 5·1, where, however, the difference of lustre between the stars was perceived, in 1878, to fluctuate from 0·34 to 1·69 magnitude ("Harvard Annals," xi. 136, xiv. 463). Dunér considered the principal star to be steadily of 4, the companion to vary from 4·2 to 4·7 magnitude ("Mésures Microm.," 1876, p. 112).

Σ 1875 is composed of two white stars at 3″·2, the preceding of about ninth, the following varying from 8·5 to tenth magnitude. Dunér had no doubt of the reality of these changes ("Mésures Microm.," p. 70; Struve, "Mens. Microm.," p. 73).

Atlas Pleiadum = Σ 453.—Found double at 0″·79 by Struve in 1827, doubtfully "wedged" in 1830, single with a power of 800 in a clear sky in 1836 ("Mens Microm.," p. 283). As single it has been seen by every subsequent observer, including Burnham, who at intervals during five years searched vainly for the companion detected and always fully believed in by Struve (Mems. R. A. Soc., xliv. 230). But during the passage of the moon across the Pleiades, January 6, 1876, Hartwig recorded the immersion of Atlas as non-instantaneous, a faint remnant surviving the chief part of the light for six-tenths of a second. He did not then know that the star had been marked at Pulkowa "duplex difficillima" (Winnecke, *Astr. Nach.*, No. 2074).

72 Ophiuchi = OΣ 342 is a somewhat similar example. An eighth magnitude companion at 1″·5 was discovered by O. Struve in 1842, but could rarely afterwards be seen, and excited vehement suspicions of pronounced variability ("Pulkowa Catalogue," No. 342). It was last observed at Pulkowa in 1876, and never elsewhere than at Pulkowa except once by Father Secchi at Rome in August 1859 (NATURE, vol. xvi. p. 194). Newcomb could find no trace of it with the Washington 26-inch on two exceptionally fine nights in 1874, nor Hall in 1876. Burnham was equally unsuccessful, and after much fruitless scrutiny recorded the star as "certainly single" in a "first-class night" of August 1880 (Mems. R. A. Soc., xliv. 276). Its spectrum, like that of Atlas in the Pleiades, is conspicuously of the first type.

β Cygni was found by Klein variable from 3·3 to 3·9 magnitude in 1862–63 (*Astr. Nach.*, No. 1663). Espin holds this star to belong to a distinct class of variables (exemplified by 63 Cygni) which change less than one magnitude in a period of several years (*Monthly Notices*, xliii. 271). Webb and Gemmill agreed, in 1881–82, in finding β Cygni much waned from its former brightness (*Astr. Reg.*, xx. 14, 46). The magnitudes of its components were determined at Harvard as 3·1 and 5·2—conjointly, 3. Their photometric difference, however, appeared, from Oxford measures of November 6, 1882, to be only 1·82 magnitude (*Monthly Notices*, xliii. 102). Although 34″ apart, and immovable, their physical union is decisively affirmed by the splendid contrast of their golden and azure tints, to which complementary absorption-spectra correspond (Huggins, Phil. Trans., cliv. 431).

δ Cephei forms, with a "cærulean blue," seventh magnitude companion at 41″, a pair resembling β Cygni (Webb, "Celestial Objects," p. 270). The large star varies regularly from 3·7 to 4·9 magnitude in 5d. 8h. 48m. The maximum of May 6, 1868, was, however, stated by Schmidt to have been barely indicated (*Astr. Nach.*, No. 1745). A minute attendant at 19″ was discovered by Burnham in 1880. The spectrum of the variable is of the solar type. It has virtually *no* proper motion.

α Herculis = Σ 2140 was divided by Maskelyne, August 7, 1777. The variability of the primary, discovered by Herschel in 1795, ranges from 3·1 to 3·9 magnitude in a period fluctuating between 26 and 103 days (Gore's "Variables," No. 129). The attendant is generally rated at the sixth, but Struve found it to change from fifth to seventh magnitude ("Mens. Microm.," p. 97). The colours of the pair are vividly contrasted orange and emerald. The large star shows a magnificent banded spectrum of III.*a* type; the smaller, one analogous to that of the companion of β Cygni in having its absorption almost wholly below the green (Huggins, Phil. Trans., cliv. 432). The common proper motion of the pair carries them in a century over a space nearly equal to the interval separating them (4″·5).

h 1470 = Lalande 38428.—Both stars are supposed to be variable, but have been little observed. Secchi estimated them of 7 and 8 magnitudes in 1856, and measured their distance at 23″·8. Physical relationship is indicated by their "superb" coloration in red and blue ("Catalogo di 1321 Stelle Doppie," p. 117; Webb

"Celestial Objects," p. 294). The spectrum of the red component resembles that of *a* Herculis (Espin, *Astr. Nach.*, No. 2825).

U Cygni = Schjellerup 239*a* was discovered by Knott, in 1871, to vary from 7·7 to below 11 magnitude in a period of 466 days (Gore's "Variables," No. 163). It had previously been remarked by Birmingham for its deep ruby tint (*Astr. Nach.* No. 1809). An attendant at 62″ appears to fluctuate in light from 8 to 8·7 magnitude, in colour from a decided blue to white and reddish (Birmingham, Trans. R. Irish Academy, xxvi. 300; Tarrant, Journ. Liverpool Astr. Soc. vi. 124; *English Mechanic*, xliv. 368; Gemmill, *ibid.*, xlvi. 340). The spectrum of U Cygni is of III.*b* type, but the zones are feeble (Dunér, "Étoiles de la 3e Classe," p. 73).

U Cassiopeiæ = OΣ (App.) 254.—A pair very similar to the preceding. The red star (= Schjellerup 280) varies from 7 to 9, the blue from 8 to 10 magnitudes, both in uncertain periods. Their distance, as measured by Dembowski in 1873, and by Burnham in 1881, is 58″·84 ("Publications of Washburn Observatory," i. 157).

U Puppis = Lalande 14551, found by Espin in 1883 to vary from 6 to 6·8 magnitude in 14d. 0h. 21½m. (*Monthly Notices*, xliii. 432). Burnham resolved it January 28, 1875, into two components, respectively of 6·5 and 8·5 magnitudes at 0″·8 (*Astr. Nach.*, No. 2062). Colour yellowish; spectrum of the solar kind. Proper motion insensible (Sadler, Journ. Liverpool Astr. Soc., v. 142). With a ninth magnitude star at 20″, it forms the fixed pair Σ 1097.

U Tauri is no longer included in lists of variables, the fluctuations noticed by Baxendell, 1865-71, having ceased to be perceptible (Schönfeld, *Jahresbericht*, Mannheim, xl. 51). It is unknown whether they affected one or both of two nearly equal components of 9·7 magnitude (distance 4½″), into which Knott divided the star, December 4, 1867 (Mems. R. A. Soc., xliii. 78). This interesting object has received little or no attention of late.

η Geminorum was discovered by Burnham at Mount Hamilton, November 11, 1881, to be made up of a third and a ninth magnitude star at 0″·96. "A splendid unequal pair," he remarked, "and likely to prove an interesting system" (Mems. R. A. Soc., xlvii. 204). He re-examined it at Dearborn a couple of months later, but we are not aware of any subsequent observation. The variability of η Geminorum in a period of 229 days was noticed by Schmidt in 1865. Its greatest extent of one magnitude is rarely attained, and the phases often seem nearly obliterated (Schmidt, *Astr. Nach.*, Nos. 1745, 1988, 2297.) The spectrum is an ill-marked specimen of Class III.*a*.

Y Virginis = Lalande 25086 was found by Schmidt in 1866 to vary from fifth to eighth magnitude in an undetermined period (*Astr. Nach.*, No. 1597). Ptolemy marked it of fifth, Abdurrahman Sûfi as approaching sixth magnitude (Schjellerup, "Description des Étoiles," p. 160). Piazzi catalogued it eighth, but observed it 6·7 and 7 magnitude. It figures in Lalande as of 6·5, in the Madras and Brisbane Catalogues as of sixth magnitude (NATURE, vol. xx. p. 248; "Harvard Annals," xiv. 456). Photometrically determined at Harvard, it came out of 5·7 magnitude. It is the only "Sirian" star showing considerable irregular fluctuations. Its duplicity was detected by Burnham in 1879, the components (0″·48 apart) being estimated as of 6·2 and 6·5 magnitudes. Re-measurements on three nights of 1881 gave no conclusive evidence of change (*Observatory*, iii. 92; Mems. R. A. Soc., xlvii. 190).

A. M. CLERKE.

NOTES.

THE medals of the Royal Society have this year been awarded as follows:—The Copley Medal to Prof. Huxley, for his investigations on the morphology and histology of vertebrate and invertebrate animals; the Rumford Medal to Prof. P. Tacchini for his investigations on the physics of the sun; and the Davy Medal to Mr. W. Crookes, for his investigations on the behaviour of substances under the influence of the electric discharge in a high vacuum. The Royal Medals have, with the approval of Her Majesty, been awarded to Baron Ferdinand von Mueller, for his investigations of the flora of Australia, and to Prof. Osborne Reynolds, for his investigations in mathematical and experimental physics. The medals will be presented at the anniversary meeting on November 30.

FREQUENT application having been made to Mrs. Spottiswoode for copies of papers by her late husband, the President of the Royal Society, she has decided to have them published in a collected form. The collection and editing of the mathematical papers she has intrusted to Mr. R. Tucker.

THE tone of the debate on the Education Estimates last Friday was eminently satisfactory. All who took part in it seemed to recognize that our system of elementary education is still very far from perfection. Sir John Lubbock evidently expressed the general feeling of the House of Commons when he complained that "the great faults of the present system were that it was too bookish and too dry." Mr. Mundella had a good deal to say—and said it well—on the necessity of the education of children being carried on to a much more advanced stage than that at which it now usually stops. "So long as the school life of the child was so short and limited," he said, "it was no use, in his judgment, talking about improved methods or an improved curriculum. So long as a child could enter a factory as a half-timer at ten years of age, or, as was the case in 8000 or 10,000 parishes in England, children were allowed to leave school after passing Standard IV., it did not matter what their curriculum was, or what their methods were, they could have no good results. It was impossible for them to force a number of compulsory subjects into a child who was to follow the plough-tail before he was eleven years of age. In the counties around London it was found that children left school after passing Standard IV., which they generally did about ten. There could not be a greater waste of money than to educate a child up to ten years of age at the expense of the State, and then turn him out into the world, the eventual result being that by the time he had reached thirteen he had forgotten everything he had learnt." After quoting from the report of Mr. Matthew Arnold as to the curriculum in force in Germany, showing that in Hamburg, for instance, there are thirteen obligatory subjects taught in the elementary schools, English being one of the subjects, Mr. Mundella pointed out that in Prussia no child leaves school until he is fourteen. Even after he leaves school, unless he can satisfy the school authorities, he must attend the continuation schools until he reaches sixteen or seventeen years of age.

ADMIRAL MOUCHEZ has received a magnificent set of photographs sent by the French Embassy at Pekin, illustrating Mr. Russell's lecture on the Pekin Observatory, of which we gave an account last week. These photographs will be exhibited in the astronomical museum of the Paris Observatory.

DURING the recent meeting of the British Association at Bath, Mr. G. J. Symons found in the Jenyns Library a manuscript meteorological register of considerable importance—namely, the original daily records kept by the Rev. James Cowe, at Sunbury Vicarage, Middlesex, from 1795 to 1839. It gives barometer, maximum and minimum temperatures, wind, rain, and remarks for each day. This record covers a period respecting which there has been much uncertainty as to both temperature and rainfall, and several meteorologists are of opinion that it should