above the surface on which it rests. But any abrupt change in the slope of the surface near the gauge, whether it be an embankment across a valley, a cliff, or a steep roof, or tower, allows the wind to set up eddies, or acquire an increased velocity, and so to reduce the amount of rain received in a horizontal gauge." These principles are clear enough, and they show the need for the adoption of a uniform height of gauge by all members of the rainfall organisation. At present it appears that not half the gauges in use are placed at exactly the standard height.

MESSRS. SWAN SONNENSCHEIN AND CO. have published a third and revised edition of "Land and Fresh-water Shells," by Mr. J. W. Williams, with a chapter on the distribution of the British land and fresh-water Mollusca, by Mr. J. W. Taylor and Mr. W. Denison Roebuck.

THE additions to the Zoological Society's Gardens during the past week include a Sooty Mangabey (*Cercocebus fuliginosus*) from West Africa, presented by Mr. G. Nicholson; a Rhesus Monkey (*Macacus rhesus*, ♀) from India, presented by Mr. J. McCarthy; a Short-toed Eagle (*Circaëtus gallicus*) from the Atlas Mountains, presented by Captain W. R. Taylor; a Passerine Parrot (*Psittacula passerina*) from South America, presented by Mr. W. C. Stronge; two Turtle Doves (*Turtur communis*), British, presented by Miss L. Cox; a Greek Tortoise (*Testudo graeca*) from South Europe, presented by Mr. Balfour Read; a Neumann's Baboon (*Cynocephalus neumanni*) from Central Africa, a Nisnas Monkey (*Cercopithecus pyrrhonotus*) from East Africa, a Striped Hyæna (*Hyaena striata*, var.) from North Africa, three Pale Fennec Foxes (*Canis pallidus*) from the Soudan; a Brazilian Caracara (*Polyborus brasiliensis*) from South America, a Black-headed Conure (*Conurus nanday*) from Paraguay, an Egyptian Monitor (*Varianus niloticus*) from North Africa, two Brazilian Tortoises (*Testudo tabulata*) from South America, two Sculptured Terrapins (*Clemmys insculpta*) from North America, three Muhlenberg's Terrapins (*Clemmys muhlenbergi*) from North America, a Pennsylvania Mud Terrapin (*Cinosternum pennsylvanicum*) from North America, three Laughing Kingfishers (*Dacelo gigantea*) from Australia, two White-capped Tanagers (*Stephanophorus leucocephalus*) from Argentina, three Striated Tanagers *Tanagra striata*) from Buenos Ayres, four Palm Tanagers (*Tanagra palmarium*) from South America, a King Snake (*Coronella getula*) from North America, two Ocellated Sand Skinks (*Chalcides ocellatus*) from North Africa, deposited; four Lesser Snow Geese (*Chen nivalis*) from North America, two Mute Swans (*Cygnus olor*), European, purchased; a Thar (*Hemitragus jemlaicus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

SPECTRUM OF NOVA PERSEI.—A communication from Prof. Pickering to the *Astronomische Nachrichten* (Bd. 156, No. 3735) gives particulars of the examination of recent photographs of the spectrum of the Nova taken at the Harvard College Observatory. The reductions show that, as has been the case in previous Novæ, the object has been gradually changing into a gaseous nebula. The resemblance to the nebula N.G.C. 3918 was so close on June 20 that no marked difference in the two spectra was noticeable. The main point of divergence is in the relative intensity of the chief nebular line at λ5007, which in N.G.C. 3918 is about eight times as bright as Hβ, while in the Nova these two lines are about equal in intensity.

The following lines are common to both bodies:—

3869	4688
3970, Hε	4862, Hβ
4102, Hδ	4959
4341, Hγ	5007

and with the above-mentioned exception of λ5007 are of similar intensity. Four bright lines between Hγ and Hβ appear faintly in the Nova, and are not present in the nebula, while one, at λ4364, is seen in the nebula, but not in the Nova, perhaps owing to the proximity of Hγ.

NEW DOUBLE STARS.—*Bulletin* No. 3, from the Lick Observatory, contains a list of 94 new double stars discovered by Mr. R. G. Aitken, with the 12-inch and 36-inch telescopes, the majority of the measures being obtained with the larger instrument. The series has been compared with Prof. Burnham's Catalogue to ensure the absence of duplicate records of previous discoveries. Classified according to distance of their components the 94 pairs show the following grouping:—

Under 0".25	3
0".50	23
1".00	47
2".00	73
Over 5".00	1

SIX STARS WITH VARIABLE RADIAL VELOCITY.—Prof. W. W. Campbell gives particulars in *Bulletin* No. 4 of the Lick Observatory of six additional spectroscopic binaries, of which variable velocity in the line of sight has been determined from spectra obtained with the Mills spectrograph of the Lick Observatory. The details of the measures are given below:—

Star.	Extreme velocities (kilometres).	
π Cephei	−37	−5
$o_1$31 Cygni	−12	+3
ξ Piscium	+25	+35
τ Persei	+10	−4
$ξ_1$ Ceti	−9	+4
ε Hydræ	+43	+32

CAUSES OF THE VARIABILITY OF EARTHSHINE.—In the May number of the U.S. *Monthly Weather Review*, Mr. H. H. Kimball gives an interesting discussion of the probable causes of the earthshine observed on the moon's shadow side some few days previous to, and following new moon. With the idea that the amount of light reflected from the earth to the moon will vary considerably according to the condition of the earth's surface and atmosphere, a special projection chart of the earth has been prepared, showing the configuration of the continents, oceans, &c., and general atmospheric conditions (clouds, &c.), on a certain evening when the earthshine was specially prominent. If the bright portion is snow-covered, it will reflect more than a continent of forest and vegetation, and much more than a large extent of water.

A factor of considerable importance is the varying distance of the moon, and it is stated that 52 per cent. of the change in intensity of the earthshine is due to the eccentricity of the moon's orbit, and this is probably much greater than could be expected from any increase or diminution in the average cloudiness over the hemisphere of the earth reflecting light to the moon.

SOLAR RADIATION.

SOLAR radiation is a subject which has more than scientific interest. It is the source of all the energy which maintains the economy of our globe. It lights and heats the other members of the planetary system. But, after accomplishing this, only an infinitesimal proportion of the total radiation has been used. The remainder, in so far as we know, is wasted by uninterrupted dissipation into space.

The subject can be regarded and studied from either the solar or the terrestrial point of view. In terrestrial physics everything may be said to depend on the energy which, in one form or another, is supplied by the sun's rays. It is the revenue of the world, and it is of fundamental importance for us to know at what rate it falls to be received.

Roughly speaking, the surface of the earth is occupied to the extent of one-fourth by land and three-fourths by sea. Therefore at least three-fourths of the surface which the earth presents to the sun is at the sea-level. Consequently the rate at which the sun's radiant heat arrives at the sea-level is the fact which it is of the greatest economical importance to ascertain.

In considering this problem we have to answer two questions: What is the best experimental method of determining the heating power of the sun's rays at any place? and What is the best locality for making the experiment? Let us take the last first. The energy which a radiation communicates to a surface