

Paul Parey, of Berlin, under the title of "Landwirtschaft in England."

THE current number of Wundt's *Philosophische Studien* contains two experimental articles—both dealing with problems of psychological optics. The first (A. Kirschmann, "Beitrag zur Kenntniss der Farbenblindheit") gives an account of a number of interesting cases of colour-blindness, together with criticisms of existing theories. A unique case is that of an inherited, unilateral (left) blindness to the qualities violet, green and yellow. In the second (E. B. Titchener, "Ueber binoculare Wirkungen monocularer Reize") an attempt is made to show that stimulation of one retina is followed by an excitation-process in the other. The psychophysical results are supported by recent physiological discovery.

THE following are the arrangements at the Royal Institution for the Friday evening meetings before Easter, 1893:—Friday, January 29, Prof. Dewar, F.R.S., liquid atmospheric air; Friday, January 27, Francis Galton, F.R.S., the just-perceptible difference; Friday, February 3, Alexander Siemens theory and practice in electrical science (with experimental illustrations); Friday, February 10, Prof. Charles Stewart, some associated organisms; Friday, February 17, Prof. A. H. Church, F.R.S., turacin, a remarkable animal pigment containing copper; Friday, February 24, Edward Hopkinson, electrical railways; Friday, March 3, George Simonds, sculpture considered apart from archaeology; Friday, March 10, Sir Herbert Maxwell, early myth and late romance; and Friday, March 17, William James Russell, F.R.S., ancient Egyptian pigments. On Friday, March 24, a discourse will be delivered by Lord Rayleigh. On March 31 and April 7 (the Fridays in Passion and Easter Weeks) there will be no evening meetings.

THE following are the arrangements for lectures at the Royal Victoria Hall in January:—January 3, Mr. Charles E. Reade on a trip through India, with anecdotes of the mutiny; January 10, Mr. A. Hilliard Atteridge on some old Belgian towns; January 17, Prof. Carlton Lambert on the romance of the stars; January 24, Dr. Dallinger on spiders, their work and their wisdom.

THE fermentative changes which the leaves of the tobacco plant are made to undergo before they are worked up and finally handed over to the public, are of the greatest importance in determining the quality of any particular tobacco. It was formerly supposed that the alteration in its condition thus brought about was due to purely chemical changes induced by the process of "sweating" which the leaf undergoes, but some interesting experiments made recently go to show that these important results are effected by special micro-organisms. In a paper read before the German Botanical Society, Suchsland gives an account of some investigations which he has been conducting on the bacteria found in different kinds of tobacco. He has examined fermented tobacco from all parts of the world, and found large numbers of micro-organisms, although but few varieties, mostly only two or three different species in any particular brand and but rarely micrococcus forms. But what is of especial interest is the discovery that pure cultures of bacteria obtained from one kind of tobacco and inoculated on to another kind, generated in the latter a taste and aroma recalling the taste and aroma of the original tobacco from which the pure cultures had been in the first instance procured. Thus it may be possible in the future to raise the quality of German tobacco, not, as heretofore, so much by careful culture and judicious selection of varieties, which has so far proved unsuccessful, but by inoculating pure cultures of bacteria found in some of the fine foreign tobaccos on to our own raw material, whereby similar fermentative changes may be induced

and the quality correspondingly improved. The further results promised by Suchsland will be looked for with much interest. In connection with the above experiments on the "transplantation," so to speak, of micro-organisms, it is interesting to note some results obtained lately by Nathan (*Die Bedeutung der Hefenreinzucht für die Obstweibereitung*). The amount of alcohol present in such wines as cider, currant wine, etc., is generally from 3 to 4 per cent. This small proportion is possibly in part due to the necessarily large dilution of the fruit with water, which considerably reduces the nitrogenous constituents of the "must," and also to the fact that the yeast, according to Hansen mostly present on sweet fruits is the *Saccharomyces apiculatus*, which only possesses a feeble fermentative power. Experiments were made to see whether, by increasing the nitrogenous constituents of the "must," and introducing a pure cultivation of a vigorous wine-yeast, the yield of alcohol would be greater. It was found that by adding a small amount of nitrogenous material, such as 0.15 gram. ammonium chloride, and 5 cubic centimetres of wine-yeast per litre to the "apple-must" (which was the fruit selected) 2 per cent. more alcohol was obtained, and not only was this the case, but this cider possessed a finer and more vinous taste than that untreated, or which had only received an additional supply of ammonium chloride without the wine-yeast. Kosutany in a paper published in the *Landw. Versuchsstationen*, 1892, has recorded the results of his investigations on the behaviour of certain species of wine-yeast. He states that not only is the percentage of alcohol yielded very different with particular yeasts, but that also the taste, smell, and bouquet of the wine inoculated with special cultures were distinctly different according to the variety of yeast employed. It is hoped that, as in the case of tobacco so with wine, it may be possible to raise the quality by the judicious transplanting of bacteria obtained from finer brands.

THE additions to the Zoological Society's Gardens during the past week include a — Squirrel (*Sciurus* —) from China, presented by Mr. Julius Neumann; a Crowned Hawk Eagle (*Spizaetus coronatus*) from South Africa, presented by Mr. T. H. Mills; a Macaque Monkey (*Macacus cynomolgus* ♀) from India, deposited; three Sulphury Tyrants (*Pitangus sulphuratus*) from South America, six common Widgeons (*Mareca penelope*, 3 ♂, 3 ♀), four common Pintails (*Dafila acuta*, 2 ♂, 2 ♀), two Pintailed Sand Grouse (*Pterocles alchata*, ♂ ♀) European, purchased.

OUR ASTRONOMICAL COLUMN.

JUPITER'S FIFTH SATELLITE.—Mr. A. A. Common, in a letter to the *Times* for December 28, writes with respect to the fifth satellite of Jupiter:—

"This extremely difficult telescopic object discovered by Prof. Barnard last September at the Lick Observatory has been looked for with the 5ft. reflector on several occasions. On October 18 and on December 13 it was pretty certainly seen, by me on the first occasion, and by Mr. Albert Taylor on the second. The last two evenings (Sunday and Monday) have been very fine, and on each, between five and six o'clock, the satellite has been seen with certainty by Mr. Taylor and in glimpses by me.

"The brightness seems less than that assigned to it by Prof. Barnard, but this may be due to the very much better sky they enjoy at Mount Hamilton; the glare from Jupiter would be with them very much less, so that they would have the planet on a much darker background, and it would appear brighter than it does here.

"I have not heard of any other observations having been made out of America."

COMET BROOKS (NOVEMBER 20, 1892).—*Edinburgh Circular*, No. 36, gives the ephemeris of this comet, from which the following extract is made. This comet, according to Ber-

berich's computations, will soon commence to decrease in brightness.

Berlin, Midnight.

1892-93.	R.A.	Decl.	Log r.	Log Δ.	Br.
	h. m. s.	o. ' "			
Dec. 30 ...	15 57 15 ...	58 31'0			
31 ...	16 16 30 ...	60 21'3	0'0820	9'8589	7'66
Jan. 1 ...	16 38 18 ...	62 1'9			
2 ...	17 2 46 ...	63 29'7	0'0812	9'8530	7'89
3 ...	17 29 49 ...	64 41'7			
4 ...	17 59 0 ...	65 34'5	0'0807	9'8521	7'95
5 ...	18 29 40 ...	66 5'4			

COMET HOLMES (NOVEMBER 6, 1892).—The following is a continuation of the ephemeris of this comet for the present week :—

Berlin, Midnight.

1892-3.	R.A. (app.)	Decl. (app.)	Log r.	Log Δ.
	h. m. s.	o. ' "		
Dec. 30 ...	1 2 22 ...	+33 59'5		
31 ...	3 24 ...	57'2		
Jan. 1 ...	4 27 ...	55'1	0'4096	0'3284
2 ...	5 31 ...	53'1		
3 ...	6 36 ...	51'3		
4 ...	7 42 ...	49'6		
5 ...	1 8 50 ...	33 47'9	0'4119	0'3400

THE MARKINGS ON MARS.—In No. 25 of the Publications of the Astronomical Society of the Pacific, Mr. Schaeberle has a preliminary note on the question as to whether the darker and the brighter areas on Mars are water and land or *vice versa*. Having observed the planet from June 11 up to the present time he has been led to the conclusion opposite to that of Schiaparelli, Flammarion, and other observers, and considers that after all the dark portions should be considered as land and the brighter as water. In raising such a question as this Mr. Schaeberle has been very reserved, for should his opinion receive due attention, as of course it should do, and be corroborated, the planet's surface will be looked upon in quite a different light than formerly. In this note he sets forth a few of his reasons for coming to such a conclusion, and it may interest many of our readers if we state some of them briefly. If the dark markings be taken as land, would not the irregular gradations of shade be more naturally expected than if we consider them as fixed surface features? "Light reflected from a spherical surface of water in a slight state of agitation would vary uniformly in intensity. At opposition, the centre of the planet would, for a water surface, appear brightest. Observations show that within a certain distance from the edge of Mars there is a gradual increase in the steady lustre of the brighter areas towards the centre of the planet." Assuming these dark areas to be water, then they should thus be least dark near the centre, which is somewhat contrary to observation. With reference to the "canals," he says that they on this hypothesis "correspond to the ridges of mountains which are almost wholly immersed in water," while with regard to their observed doubling he remarks that they can be explained as "representing parallel ridges of which our own earth furnishes examples." As a concluding argument he takes an observed terrestrial observation, the view of the lower end of San Francisco Bay from Mount Hamilton, San Francisco being fifty miles away. At all hours of the day, he says, "the surface of San Francisco Bay (as seen from the top of Mount Hamilton) is much brighter than the neighbouring valley and mountains at the same distance." He further adds that the line of sight makes an angle of more than 87° with the normal to the surface of the bay, while the observer's position "varies all the way from being nearly in a direct line between the bay and the sun to the position in which the sun is nearly in the direction of the bay."

THE LICK OBSERVATORY.—Miss Milicent W. Shinn is the writer of a very interesting pamphlet on the history of the Lick Astronomical Department of the University of California. In these few pages she brings together much with regard to the early events connected with the founding of the giant refractor that is not generally known. For instance, it is curious to read how Mr. Lick wished to be immortalized by leaving bequests for costly statues of himself and his family, and when urging that such statues would be preserved for all time, was answered by Mr. Staples that "more likely we shall get into a war with Russia or somebody, and they will come round here

with warships and smash the statues to pieces in bombarding the city." Mr. Lick was so struck by this, that he asked, "What shall I do with the money, then?" How this question was answered is now well known, and astronomical science was presented with the finest object-glass that was ever made.

Mr. Lick's deed prescribed that the Observatory should be "made useful in promoting science," and up to the present these words have been carried out to the letter. The big telescope has not been preserved for one side of astronomical science, but has divided into all branches, as every astronomer is aware. Not only have minute double stars been observed and measured, but the spectroscope has been employed, from which excellent results have been published, while lunar photographs, equalling, if not excelling, those that had been previously obtained, have brought to light much to set us thinking about. Jupiter's fifth moon is perhaps the latest arrival of which we have heard, and this, following just 300 years after Galileo's discovery, would alone render the Observatory famous. That the Lick Astronomical Department, during the few years of its existence, has done an immense amount of good work, especially when one takes into account the comparatively small staff on hand, cannot be denied, and we hope the day will come when the number of such telescopes will be increased, for the ever-opening fields of research point out how necessary they are.

WASHINGTON MAGNETIC OBSERVATIONS.—The United States Naval Observatory has quite recently published their magnetic observations that were made during the past year, prepared on the same plan as that for 1889-90. The observations for 1891, as Mr. Hoogewerff (who was in charge for the greater part of the year) informs us, are better than those of former years, owing to the fact that the reductions took place at no very distant dates from the observations, the experience thus gained helping to correct and guard against conditions which might have tended to give rise to errors. The introduction contains a description of the buildings, methods of observing, together with the personnel during the year, concluding with a description of the tabular results. The tabular results, as usual, show the mean hourly readings for the elements for each month, Table I. containing the mean values for the four years 1888-91.

Simultaneous with this volume was also issued the meteorological observations and results for the year 1888.

GEOGRAPHICAL NOTES.

A SPECIAL number of the *Mouvement Géographique* is devoted to a series of important despatches from M. Alexandre Delcommune, chief of the Lomami expedition of the Katanga Company. Entering the Lomami from the Congo, the party left the river on May 13, 1891, and explored the entirely untraversed territory between its upper valley river and that of the Sankuru as far as 8° S. Thence they turned eastward and reached Lake Kassali on the Lualaba, and struck south through Garenganze's country to Bunkeia. Making a circuit through Katanga and westward, they found the Lualaba near its source, and following it for 200 kilometres, discovered a grand gorge at Nzole, where the river flowed in a succession of wild cataracts between cliffs nearly a thousand feet high, and not more than forty yards apart. From the rapids they returned to Bunkeia, travelled north-eastward over the plateau, crossing the Luapula at its outflow from Lake Moero, and ultimately reached Lake Tanganyika. The difficulties overcome were very great, and the sufferings of the caravan have rarely been surpassed even in the grimmiest records of African travel.

AMONGST the English travellers who have recently arrived in London are Mr. Selous, the famous South African hunter, and Mr. Conway, who has probably climbed higher than any other European in the Karakoram range. Both gentlemen will read papers to the Royal Geographical Society early next year.

THE arrangements for the Royal Geographical Society's evening meetings after Christmas are unusually varied. Mr. Hose will describe his journey up the Burram river in Sarawak to Mount Dulit, at the first meeting in January. The second meeting will be devoted to the Island of Yezo, when Prof. Milne and Mr. Savage Landor will read papers. Papers by Captain Bower and the American traveller, Mr. Rockhill, on Tibet, will be given later; and Lieutenant Peary will personally describe