increased, and not declined, and from what information I have on the subject, I should say it is perhaps not less than 3,500,000*l.*

In my remarks I have also been led to refer to some of the points connected with the migration of this industry from this country to Germany and the probable influence our patent laws had upon this, to the matter of technical education, and the employment of high-class chemists in chemical work. This latter subject is undoubtedly of great importance, and requires the earnest consideration of our manufacturers. It is found profitable to employ chemists of this class on the Continent, surely it should be found equally profitable to employ them here. In conclusion, I am happy to say there are signs of the coal-tar colour industry returning to our country, in part at any rate, especially in relation to alizarin, for which there are now three large works in existence, and the production of other colouring matters is also increasing.

FAUNA OF TRANS-ALAY

IN the *Izvestia* of the Russian Geographical Society (xx. 6) we find an interesting paper by M. Grum-Grzimailo, who has journeyed in the mountains north of the Alay region of the Pamir, chiefly for zoological purposes. The immense cultivated loess-fields of Osh, devoid of trees, yielded poor zoological results. Only a few uncultivated places had in the spring a rich fauna: great numbers of birds, various *Colubridæ*, the *Pseudapus pallasii*, tortoises, immense numbers of *Bufo variabilis* were met with. Here the author gathered a very rich collection of Lepidoptera; also *Zamenis kaufmanni*, *Taphrometoron lincolatum*, *Elaphis dione*, *Eryx faculuj*, and many others. In the middle of May all these disappeared under the burning rays of the sun. On the way to Vadil several species which were not found later on were met with, such as the *Trigonocephalus halis*, the *Anthocaris pyrothoë*, and several others. The neighbourhoods of Vadil yielded nothing interesting at that part of the season (middle of June). Of vertebrates only two *Eremids* and one *Trigonocephalus hydrus* were found. Shankh-mardan and Jordan, on the contrary, gave a rich crop of insects, and M. Grzimailo remained there for ten days. On a rich Alpine pasturage, Artcha-bash, where Kirghizes are in the habit of staying, he found very rich zoological materials. The collections were enriched with a great number of rare species, such as *Pol. tamerlana*, *Colias eogene*, *Arctia erschoffi*, *Hol. jagorum*, which are common almost exclusively to the Himalayas and the South-West Thian-Shan, as also by several new species. On the snow-covered plateaux interesting specimens were found, and among them the *Megaloperdix nigelie* and the *Arctomys caudatus*. On the upper Kok-su, extending to a height of 12,000 feet, M. Grzimailo found a number of species which he did not see either before or afterwards during his journey, especially with regard to Lepidoptera. Vertebrates are few at this height; they were represented by the *Arctomys caudatus*, the eagle (*A. fulva*), one species of *Falco*, the *Frigilis graculus*, the *Pyrrhocorax alpinus?*, *Pica*, *Caccabis huckar*, *Megaloperdix*, and *Columba*. On the pass itself the holes of the *Arctomys caudatus* are seen everywhere, as also holes of some *Arvicola*. The Lepidoptera are richly represented at that part of the summer, especially the two genera *Colias* and *Parnassius*. On the Djekaindy Pass it was the same; the *Lycænæ* were very numerous, so that on the space of 3 metres the author found fifteen species of them, of which three were unknown to him. Without mentioning localities of minor interest, the plateau between the Kara-su and the Aram is worthy of notice for the brilliant collections of Lepidoptera which were made there. One *Lacerta* was found at a height of 11,000 feet, a species of *Elaphis*, the *Canis melanotus*, the *Lepus lehmanni*, the *Ovis polii*; of birds, the Falconidæ were most usual; also the *Upupa epops*, the *Cuculus canorum*, species of *Columba*, the *Orthygion coturnix*, *Caccabis huckar*, *Corvus corax*, and many others, this last reaching the highest parts of the region. Another find of great interest must be mentioned. The late Mr. Fedchenko had already caught one female Lepidopteron, which was determined by M. Erschoff as *Colias nastes*. This species having been found formerly only in Labrador and Northern Lapland, the determination remained doubtful, the individual having been but a female. M. Grzimailo has happened to catch a number of both males and females, which really proved both to belong to *C. nastes*. It remains now to explain the strange extension of this species.

SCIENTIFIC SERIALS

Rendiconto della R. Accademia delle Scienze di Bologna, 1884-5.—On the geometrical construction of the central axis in a given system of forces, by Prof. F. P. Ruffini.—A fresh contribution to clinico-experimental studies, showing the depressing action of ipecacuanha administered in large doses in pulmonary affections, by Prof. F. Verardini.—On the velocity of the polarised rays in a body endowed with rotatory motion, by Prof. Augusto Righi.—On the physico-pathology of the suprarenal capsules, by Prof. Guido Tizzoni.—On *Perineo melus*, a new genus of parasite observed in the pig, by Prof. Cesare Taruffi.—On the antimoniates of bismuth, by Dr. Alfredo Cavazzi.—Action of gaseous phosphated hydrogen on the trichloride of gold dissolved in ether, in alcohol, and in water, by Dr. A. Cavazzi.—On conjugated conic sections, by Prof. Virginio Retali.—Some researches on the so-called syntomatic carbuncle in cattle, by Prof. Alfrede Gotti.—Observations on Jacobson's organ and on Stenson's duct in the camel, by Dr. Francesco Peli.—On the central termination of the optical nerves in mammals, by Prof. Giuseppe Bellonci.—On the paraboloid surfaces in the selliform rhombohedrals of dolomite and other anhydrous carbonates, by Prof. Luigi Bombicci.—Some general observations on the systems of functions, by Prof. Salvatore Pincherle.—On a monstrous fœtus requiring the operation of embriotomy for its delivery, by Dr. Cesare Belluzzi.—On the question of sex in *Tolyposporium cocconii*, by Dr. Fausto Morini.—On the fossil remains of Dioplodon and Mesoplodon occurring in the Upper Tertiary formations in Italy, by Prof. Giovanni Capellini.—Forensic experiments in traumatology with firearms, by Dr. Giuseppe Ravaglia.—Contributions to the chemical study of intestinal perforation in typhoid fever, by Prof. Giovanni Brugnoli.—On the mode of genesis of a polar globule in the ovarium of certain mammals, by Prof. Giuseppe Bellonci.—A systematic enumeration of the funguses in the province of Bologna, by Dr. Fausto Marini.—On the thermal emissive power of electric sparks, by Prof. Emilio Villari.—On the use of curvilinear co-ordinates in the theory of the potential and of elasticity, by Prof. Eugenio Beltrami.—An analytic method of determining the equation of time, by Prof Antonio Saporetti.

SOCIETIES AND ACADEMIES

BERLIN

Physiological Society, June 19.—Dr. J. Munk gave a brief sketch of the different views put forth respecting the formation of fat in the animal body, and then gave a short account of the now almost universally accepted view of Voit, who, on the basis of his very numerous experiments, laid down the doctrine that the fat in the animal body proceeded either from the alimentary fat, or, when this was not sufficient, from the albumen, which on its decomposition yielded products that by synthesis became transformed into fat, while the carbo-hydrates never yielded material towards the formation of fat in the animal body. Opposition to this doctrine was raised on the side only of agricultural chemists, who, by experiments on swine and geese produced direct demonstration that the deposition of fat was considerably increased by feeding with carbo-hydrates. In consequence of these experiments Prof. Voit admitted that omnivorous and herbivorous animals might in certain circumstances form fat out of carbo-hydrates; such, however, he maintained, was never the case with carnivorous animals and man; in them all fat was derived from the alimentary fat and the decomposition of albumen, both in his own experiments and in all hitherto published, and the fat was seen to be derivable from these two sources alone, even though only 12 per cent. of the decomposed albumen were taken for the formation of fat, and much more if, according to the theoretic calculations of Herr Henneberg, it was assumed that as much as 51 per cent. of the decomposed albumen might be utilised towards the formation of fat. Seeing now that Prof. Voit admitted that, in the case of omnivorous and herbivorous animals fat was produced from carbo-hydrates, the speaker set himself the task of establishing experimental conditions under which fat might be formed from carbo-hydrates in the case, likewise, of carnivorous animals. For these experiments he selected a dog, completely impoverished it of all fat by means of long fasting, and then gave it an aliment very rich in carbo-hydrates. The animal required to be young, or otherwise the loss of fat by fasting could not be complete, and if it were desired to obtain certainty respecting the attainment of perfect

deprivation of fat, the decomposition of the albumen during the period of fasting would have to be traced by regular determinations of the quantity of azote in the urine and the excrement. Prof. Voit had (as was already known) proved that on account of its ready decomposibility, fat was a protection against the decomposition of albumen; such would necessarily be the case in the fasting organism likewise, and the corporeal fat would necessarily protect the albumen from decomposition. In point of fact Dr. Munk found in fasting animals that when they were poor in fat the decomposition of albumen slowly abated in correspondence with the ever less abatement of the weight, whereas in the case of individuals rich in fat, the nitrogenous secretions in the last period, after the corporeal fat at disposal had been decomposed, did not only not abate, but even increased somewhat. The same cause as that followed by the nitrogenous secretion was also observed in the case of the elimination of sulphur. The exact process of albuminous decomposition during fasting thus offered an indication of the attainment of complete deprivation of fat in the body. The carrying out of the experiments was, however, attended with so many difficulties, that hitherto only one experiment had succeeded. It had reference to a large dog of three to four years old, weighing about 35 kilogrammes, which had been made to fast for thirty-one days, and was then fed daily with 200 grammes of meat, 100 grammes of lime, 400 grammes of starch, and 500 grammes of sugar, made into a preparation very acceptable to the dog. The gluten was occasionally added to the aliment to restrict the decomposition of the albumen. The experiment might be continued for twenty-five days; in the two last days diarrhœa set in, and the dog was killed in order to determine precisely the contents of fat in the body. The weight of the body of the dog during the process of feeding had increased by four kilogrammes, and amounted at the end of the experiment to 27 kilogrammes. Of the albumen partaken only 800 grammes were left undecomposed in the whole body. At the outset, therefore, it could be inferred that the dog had formed and deposited a considerable quantity of fat—an inference which was confirmed by the examination of the body. The fat of the underskin tissue and of the mesentery was carefully cut out, melted, and weighed. Then the amount of fat on the muscles was determined in particular samples, and the fat on all the muscles of the animal calculated. The fat of the liver was directly ascertained, and, finally, an account was taken of the fat of the bones, the nerves, and the other organs, which was admitted to be only half the amount which other physiologists had obtained on the same parts in an individual whose skin, muscle, and liver fat corresponded with that of the dog examined in the present case. Certainly the quantity of fat thus found was considerably less than the quantity actually formed during the time of the experiment. From this sum of fat deposited by the dog there was now deducted the total amount of the alimentary fat which had been appropriated, and of the fat which might have been formed from the decomposed albumen (12 per cent.). The result was a remainder of over 900 grammes of fat formed by the dog, which was derivable neither from the alimentary fat nor from the decomposed albumen, and which had, therefore, to be attributed to the carbo-hydrates that had been copiously administered. The speaker instituted a second calculation, taking account of the assumption which had hitherto, however, never been proved or even rendered probable by a single experiment, but was purely a deduction from constitutional formulæ—the assumption, namely, that of the decomposed albumen as much as 51 per cent. might be utilised towards the formation of fat. But even under this supposition there still remained more than 400 grammes of fat formed by the dog which, contrary to the doctrine of Prof. Voit, must have been produced from the carbo-hydrates. In compliance with a suggestion thrown out in the discussion of the question the speaker had, furthermore, calculated as a fat-former the whole of the lime taken by the dog, although all experiments had demonstrated that lime in no case produced fat; and yet, after that item had been fully taken account of, there were about 60 grammes of fat left that could be derived only from the carbo-hydrates. Dr. Munk therefore deemed it indisputably demonstrated by this experiment that in the case of carnivorous as well as omnivorous and herbivorous animals carbo-hydrates might in certain circumstances contribute towards the formation of fat.—Dr. Höltzke, following up a communication recently made by him respecting the influence of narcotics on pressure in the eye, reported experiments he had made concerning the influence of the blood-pressure on the intra-ocular pressure. The view had hitherto been universally accepted that the pressure in the eye was dependent on the blood pressure, and a series of experiences and experiments had been collected by way of proving this dependence. The nerves had likewise shown that they exerted an influence on the pressure in the eye, so far as they influenced the vascular system. Of the sympathetic in particular it was asserted that its paralysis induced an augmentation, whereas stimulation of the nerve caused a diminution of the intraocular pressure, and this converse process was said to be connected with the expansion and contraction of the vessels. Seeing, however, that some investigators maintained that the effect of the sympathetic on the pressure of the eye was exactly the opposite to that just referred to, the speaker had instituted new measurements by means of a manometer, utilising the second eye in the way of control. The result at which he arrived by this means was that the cutting of the sympathetic always entailed an abatement of the pressure to an average of 6 mm. mercury, and that stimulation of the peripheral nerve ending caused an increase of the pressure amounting to 14 mm. mercury. Stimulation of the supreme ganglion of the sympathetic had the same effect. If the veins of the neck were bound on the under side and the carotid was compressed then had neither the cutting nor the stimulation of the sympathetic absolutely any effect on the pressure in the eye—a proof that the influence of the sympathetic as above stated was only mediate, that the paralysis of the sympathetic induced the lowering of the ocular pressure only in consequence of the decrease of pressure in the vascular system and that the stimulation of the nerve caused the increase of the intra-ocular pressure only because of a rise of pressure in the blood. An experiment with a view to measuring the influence of the sympathetic on an atropinised eye did not yield perfectly decisive results, a circumstance which determined the speaker to investigate once more the influence of atropine on the ocular pressure. The result was somewhat different from that recently communicated. It was now ascertained with perfect certainty that the influence of atropine by itself was a diminution of the ocular pressure and therefore the contrary of that of eserine. Only when the pupil was powerfully expanded by the atropine did the pressure in the eye rise in correspondence with the other experiences that each expansion of the pupil was accompanied by an augmentation of pressure, and each contraction of the pupil was followed by an abatement of the ocular pressure. On the expansion and contraction of the pupil, the rise or the reduction of the blood-pressure became, in turn observable, and this latter again on its side generated a rise, or, as it might be, a fall of the pressure in the eye. This parallelism of the ocular and the blood-pressure the speaker had found to hold good in all his experiments. The pressure in the vitreous body invariably showed the same changes as did the pressure in the watery chamber.

CONTENTS

	PAGE
A Possible Windfall for Science	313
Professor Tait's "Properties of Matter." By Lord Rayleigh, F.R.S.	314
Grisebach's "Vegetation of the Earth." By W. Botting Hemsley	315
Letters to the Editor:—	
Nomenclature in Elasticity.—Robert E. Baynes	316
Earthquake-Proof Buildings.—D. A. Stevenson	316
A Mechanical Telephone.—W. J. Millar	316
Electrical Phenomenon.—J. B. A. Watt	316
Our Ancestors.—$\left(\frac{1}{2}\right)^n$	317
Co-Ordination of the Scientific Bureaus of the U.S. Government	317
The Lick Observatory	320
Twilight	321
Henry Milne-Edwards	321
Radiant Light and Heat. By Prof. Balfour Stewart, F.R.S. (*Illustrated*)	322
Notes	327
Astronomical Phenomena for the Week 1885, August 9–15	330
Dr. Perkin on the Coal Tar Colours	330
Fauna of Trans-Alay	335
Scientific Serials	335
Societies and Academies	335