

low limit to which the water recedes during the monthly spring-tides. In no case less than thirty, and not unfrequently more than forty feet represents the vertical height of the rise and fall of the tide on these occasions, the waves on their retreat exposing to view and rendering accessible an extent of rocks and life-teeming pools that constitute a veritable elysium to the marine zoologist or botanist. The situation of Jersey, again, is such as to render it not only readily accessible to English naturalists and students, accompanied with just that amount of sea-passage requisite to satisfy the marine predilections of our countrymen, but it is also most conveniently reached from France, Belgium, Holland, and other Northern European countries, and which will thus invest the institution with international utility. Paris, indeed, already supplies a considerable number of the numerous summer visitors to the island, and from these no doubt might be enticed a strong contingent of students for the laboratories.

As will be found in the advertisement already referred to, a special appeal is addressed to the scientific section of the community rather than to the general public for the funds required for the successful establishment of this institution, and it is certainly most desirable that an enterprise calculated hereafter to confer so great advantages upon this more limited class should receive a fair quota of support through its ranks. The sum total required, in fact—5,000*l.*—for the founding of this zoological station, and all accessory departments, is so comparatively small as to place it not quite beyond the pale of hope that sufficient enthusiasm to effect the purpose may be yet forthcoming from among the more wealthy devotees to the shrine of science, and in emulation of the praiseworthy example set on the other side of the Atlantic by Mr. John Anderson, the munificent founder and endower of the Penikese Island Station. At all events, it is scarcely to be anticipated that so desirable an undertaking, replete with such promise of future advantage to the scientific world, will long lack the essential "sinews of war," considering that a contribution by each member of one only of our leading metropolitan scientific societies of less than one-half of his annual subscription to that society, would more than suffice to defray the whole expenditure contemplated. Through the kind liberality of a few, moreover, and the financial confidence of others, a small but substantial nucleus has been already formed, and it is confidently hoped that the full sum needed may yet be raised in time for naturalists and the public generally to participate in the advantages the Channel Islands' Zoological Station and Museum of Pisciculture will place at their disposal, so early as the summer of the year 1878.

In conclusion it is perhaps desirable to note that in drawing up the legal foundation of this Channel Islands' institution the strictest care has been taken to permanently exclude all possible chance of the society's premises being used for any of those attractions of an entirely irrelevant and unscientific nature more usually associated with exhibitions of the living inhabitants of the ocean, and the existence of which must ever constitute an insuperable barrier to that good service to science which these last-named establishments might otherwise contribute. It is only under such restrictions as are above set forth that patronage and support are solicited. In recognition of the purely scientific status of this enterprise, the members of the Executive Committee, or Directors of the Society, have also unanimously resolved to accord their services as such members gratuitously; and it is further proposed, so as to divest the undertaking of any merely speculative aspect, that all profits arising from the business of the Society, beyond what would yield to the shareholders a return of five per cent., shall be devoted to the further development of the institution, or otherwise towards the aid and promotion of scientific research.

St. Helier's, Jersey

W. SAVILLE KENT

GERMAN UNIVERSITIES

THERE have been comparisons made recently both in this and in other journals between the Universities of Germany and those of this country, and as the university question is at present giving rise to much discussion, it may be useful to give some statistics with reference to the former. Such statistics are much more easily attainable for Germany than for England, as there are two German publications in which all the important information concerning the various universities of the empire is systematically arranged, viz., the *Deutsche Universitäts-Kalender* and the *Deutsche akademisches Jahrbuch*. To obtain similar information concerning the universities of the United Kingdom it would be necessary to obtain a copy of the calendar of each university. Our statistics are obtained from the *Jahrbuch*, which contains information not only relating to the universities, but also to the technical and high schools, learned societies, and libraries of the country. Some such publication is wanted here, and might be made to include not only our various universities and colleges, but also our principal public schools. The *Jahrbuch* includes, moreover, the Russo-German University of Dorpat, the Universities of Vienna, Graz, Innsbruck, Prague, Czernowitz, Basel, but these we shall not take into account.

Germany has in all twenty-one universities, each complete in all departments. The number of students matriculated and non-matriculated attending each, mostly in the 1876-77 semester was as follows:—

	Matriculated Students.				Non-matriculated.	Total.
	Theology.	Law.	Medicine.	Philosophy.		
Berlin	139	1003	281	1067	2107	4597
Bonn	163	200	118	312	36	829
Breslau	107	377	165	458	15	1122
Erlangen	136	37	102	147	—	422
Freiburg	41	64	128	60	36	329
Giessen ²	—	—	—	—	10	331
Göttingen	71	324	122	474	—	991
Greifswald	32	89	235	142	9	507
Halle	190	150	103	439	16	898
Heidelberg	9	410	101	215	60	795
Jena	66	101	71	201	20	459
Kiel	47	14	73	78	11	223
Königsberg	44	186	127	264	10	631
Leipzig	328	1102	364	1182	113	3089
Marburg	49	65	104	164	4	386
Munich	75	357	440 ³	408 ⁴	—	1280
Münster	208	—	—	223	—	431
Rostock	24	35	31	54	—	144
Strassburg	49	211	178	236 ⁵	26	700
Tübingen	295	251	138	335 ⁶	6	1025
Würzburg	150	93	547	328	22	1040
	2223	5069	3428	6787	2501	20229

Thus, then, there are about 18,000 matriculated students attending the twenty-one universities of Germany, under a teaching staff of about 1,300 paid professors, besides about 450 privat-docenten. Of the students, about one-third belong to the philosophical faculty, the faculty in which the sciences are included. Unfortun-

¹ In "Philosophy" are included the physical and natural sciences.
² The Giessen students are divided into Hessian and non-Hessian, not according to faculties.
³ Including 100 students of pharmacy.
⁴ Including 9 students of forestry.
⁵ Including 97 mathematical and natural science students, these being a separate faculty at Strassburg. The figures are for 1875-6.
⁶ Including 53 students in political economy and 141 in natural science these subjects forming separate faculties at Tübingen.

nately, in very few cases is the number of students attending the scientific as distinct from the literary classes given, and only in one or two universities has science as yet been erected into a separate faculty. If we may take the two universities, Strassburg and Tübingen, in which natural science forms a separate faculty as a criterion from which to judge of the number of students of science in the other universities, the proportion must be very large. In Strassburg, of the 236 students whom we have placed in the philosophical faculty, ninety-seven are students of science, and in Tübingen 100, or something like one-third of the whole philosophical faculty. Or again, if the number of science students is at all in proportion to the number of science teachers, the position held by science in German universities is in striking contrast to its position in our universities and colleges. Of the professors, among whom we do not count the *privat-docenten*, about one-half belong to the philosophical faculty, and of these again, nearly one-half are teachers of science, that is, in the philosophical faculty of the German universities there is one teacher on an average to every ten students, and in science the proportion is considerably greater. In these estimates we do not take account of the medical faculty, in which, in most of the universities, there are several chairs which might well be classed as belonging to science generally.

For example, the well-known anthropologist, Dr. Virchow, the conclusion of whose address at the German Association we give this week, is Professor of Pathology at Berlin, and has been able to bring the results of his special medical line of investigation to bear, in an important way, upon his anthropological researches. Both in Berlin and elsewhere, other names of eminent medical professors might be mentioned who have not only themselves made important contributions to science, but under whom students are encouraged to do so likewise.

Of the nature and extent of the scientific teaching in German universities some idea may be formed from the subjects represented by the teaching staff at Berlin, which may fairly be taken as a type of the whole. In Berlin then we find that there are (excluding the *privat-docenten*) five professors of mathematics, two of astronomy, seven of chemistry, five of physics, three of geology, four of botany, two of zoology, one of meteorology, two of geography, one of anthropology, and one of agriculture—physiology and comparative anatomy being well represented in the medical faculty, and we might well have included among teachers of science those who devote themselves to the scientific investigation of languages. But a mere statement of the number of teachers gives no adequate idea of the means at the command of a German University for training its students in science. The number of teachers in each subject secures that its various departments will be thoroughly worked out, and gives a student a chance of following out any specialty he may take up; this is made still further possible by the number and variety of institutions, museums, laboratories, collections, &c., attached to each university, not to speak of its large and comprehensive library. In connection with Berlin alone there are twenty-three scientific "Anstalten," as they are called, for practical investigation in connection with the various faculties. Had we taken the numerous *Realschule* and the high and polytechnic schools into account, where an education can be obtained quite equal to that obtainable at most of our universities and colleges, it would have been seen that higher education in Germany leaves little to be desired.

And in reference to the subject of our leader this week, we would point to these *Realschulen* as embodying the German idea of what *practical* training should be. The carefully drawn-up time-tables of these schools are an instructive study, showing, as they do, that general mental culture is regarded as of the first importance in training a youth for the work of the world.

The *Fahrbuch* gives a statement of income and expenditure in connection with only one or two of the universities. Some interesting details, however, on the contributions of the State to the universities, as well as on other points, were given in a recent number of the *Academy* by Prof. Ray Lankester:—

"The sum expended by the North German States on the twenty universities belonging to them is annually more than 500,000*l.* The Imperial Government has expended upon the new University of Strassburg alone 70,000*l.* in one year. The University of Leipzig alone receives annually from the Saxon Government over 50,000*l.* There are eight universities in North Germany which are little, if at all, less costly, and there are eleven of smaller size which receive each from 8,000*l.* to 20,000*l.* annually.

"In North Germany there is one university to every two million inhabitants; in Austria there is one to every five millions; in Switzerland one for each million; in England one to every seven millions. In the twenty North German universities there are 1,250 professors.¹ In the British Islands we ought to have sixteen universities and 1,000 professorships in order to come up to the same level in this respect as North Germany. The stipend (apart from fees) of a professor in a German university ranges from 100*l.* to 600*l.* a year. As a rule, at the age of five-and-thirty, a man in this career may (in Germany) count on an assured income of 400*l.* a year (with retiring pension). The expenditure on attendants, libraries, laboratories, and officials may be calculated as being (in a well-conducted university) more than equal in amount to the total of the professors' stipends. Taking the *average* German professorial stipend at only 200*l.* a year, we find that 250,000*l.* must be spent annually on this item alone in the North German States."

"In order to equip and carry on sixteen universities in this country which should bear comparison with the German universities, we require not less than an immediate expenditure of 1,000,000*l.* sterling in building and apparatus, and an annual expenditure of from 500,000*l.* to 800,000*l.*"

When we add to the Government subsidy the income of the universities from other sources, the sum is enormously increased. The half-million, moreover, does not include the occasional grants of the Government for special purposes. Some idea of the magnificence of these was shown in our recent "University Intelligence," where it was stated that in the budget submitted to the present Prussian House of Deputies are the following items:—Erection of the German Industrial Museum, 998,000 mk.; erection of a Polytechnic in Berlin, 8,393,370 mk.; erection of an Ethnological Museum in Berlin, 1,800,000 mk.; and for the Berlin University, erection of an Herbarium, 422,000 mk.; of a Clinic, 1,955,000 mk.; of a new building for a second Chemical Laboratory, as well as of a Technical and Pharmaceutical Institute, 967,000 mk.

OUR ASTRONOMICAL COLUMN

THE METEORITE OF JULY 20, 1860.—The occurrence of the splendid meteor of November 23, which has probably been observed with sufficient completeness to allow of the determination of its path, while it remained visible, recalls a similar object which passed over the northern parts of the United States and adjacent parts of Canada, on the evening of July 20, 1860, which was made the subject of investigation by the late Prof. J. H. Coffin, of Lafayette College, N.Y. Probably no one of these remarkable bodies has been more extensively observed, and we do not remember any case where the calculations have been more laboriously conducted, and with greater hope of reliable results.

¹ *i.e.* we presume professors strictly so-called, exclusive of "privat docenten."