inductive reasoning, or the supporting of every general proposition upon a solid foundation of positive, indisputable fact.

Learning the names of plants is but the beginning of the study of botany. It is like learning the names of our companions or schoolmates before we become really acquainted with them. After we have learned to tell plants apart and to call them by name, we have presented for study such problems as the laws governing their distribution, the relation between the florae of different continents, and the relation of variety to species, which introduces the subject of Darwinism. The study of botany also includes the fossil plants, and, by enabling us to trace the vegetable kingdom from its first appearance upon the earth through all the varying conditions of the geologic ages, opens those tremendous scientific questions as to the birth and infancy of this world of ours which we now see in its maturity, and as to what it will become in its old age. These researches afford not only the amplest mental training, but abundant occupation for the longest life.

2. *The study of botany promotes physical development.* The botanical student must be a walker; and his frequent tramps harden his muscles, and strengthen his frame. He must strike off across the fields, penetrate the woods to their secret depths, scramble through swamps, and climb the hills. The fact that he walks with an earnest purpose gives a zest to these rambles; and he comes home proud and happy from his successful search for botanical treasures, with a keen appetite and an invigorated body and mind. He has enjoyed himself more thoroughly, and gained more substantial benefit, than those who have devoted the same time to the bat, the racket, or the bicycle. In his vacations the young botanist can toughen himself by making long and delightful excursions, living all summer in the open air, and may even have opportunities for joining government exploring parties, and enjoying the active out-of-door life full of adventure and useful experience.

3. *The study of botany is of great practical utility.* It is an essential preparation for several important pursuits. The physician and pharmacist need to have a practical knowledge of those plants which are used as medicines; and, if this knowledge is not acquired in early life, the opportunity never afterward presents itself. For the protection of our rapidly dwindling forests, the services of many skilled foresters will soon be required; and the forester must be a practical botanist. So must also the horticulturist, whether professional or amateur. For the most accomplished botanists, who desire to make this their life-work, there will always be places as instructors in our many colleges.

4. *The study of botany is a source of lifelong happiness.* Whatever may be one's station or pursuit in life, it is a great thing to have an intellectual hobby, which will afford agreeable and elevating occupation in all leisure hours. Botany is one of the best of hobbies. It can be studied out of doors from early spring till the snow falls: and even in winter there is plenty to be done in the analysis of dried specimens and the care of the herbarium. The botanist lives in the fresh air and sunshine: and when he leaves the world behind, and seeks, amid the solitudes of Nature, to penetrate her wondrous mysteries, he feels the quickenings of a higher life. A taste for botany wonderfully enhances the pleasures of travel, and also gives happiness and content to him who stays at home. It is equally efficacious in preventing the *ennui* of wealth and the anxieties of poverty. If one's surroundings are uncongenial, and life proves full of cares and disappointments, it is a great solace to be able to say with Aurora Leigh,

> "I was not therefore sad,
> My soul was singing at a work apart."

For these reasons it is obvious that the study of botany is peculiarly rich in those elements which conduce to a vigorous mind and body and a robust character. It is therefore pre-eminently a manly study, and an invaluable part of a young man's education. The student may rest assured that the time and effort devoted to it are well spent; for the result will be to make him a wiser, stronger, more useful, and happier man.

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THE TENDENCY OF CONTEMPORARY GERMAN THOUGHT.

ROBERT ZIMMERMANN, writing of contemporary German literature in the *Athenaeum*, expresses the following opinion as to the philosophic tendency in Germany: —

"Scientific men, particularly physiologists and anthropologists, whose problems involuntarily touch on the domain of philosophy, and in particular of psychology, are yielding to a spiritualistic impulse that attracts them beyond the limits of the material. The science of man, according to the opinion prevalent among naturalists, is a chapter in zoölogy. The 'Entwicklungsgeschichte des menschlichen Geistes,' by Gustav Hauffe, of which the first part previously published contains 'Anthropology,' traces back the essence of man's nature to an absolute and indissoluble union of the corporeal with the psychic element, the spiritual soul with the material body, — a method that re-

minds us of Hegel, who had incorporated anthropology as the first chapter of his theory of the subjective intellect, that is, according to his use of language, of psychology, an arrangement in which he was followed by his school. Dubois Reymond's thoughtful and well-expressed 'Akademische Reden' reveal the irresistible need of something beyond this material world in their acknowledgment of 'world riddles' and of psychic phenomena as accompaniments of physical processes. The physicist E. Mach's clear-sighted 'Beiträge zur Analyse der Empfindungen' keep within the limits of 'psychophysics,' without throwing any doubt on the existence of the psychical. However, the collected essays of W. Wundt, who was bred a physiologist, prove that even an investigator who starts from purely empirical causes feels the need not only of philosophy, but also of the special branches that have always been included under this head, psychology, logic, ethics; while even metaphysic, though fallen into contempt, is asserting itself again, however much the aim of this new inductive science may differ from the old speculative one that bore the name."

CONSANGUINITY AND MENTAL UNSOUNDNESS.

THE question of the effects of consanguinity is one of those vexed problems on which much evidence has been collected *pro* and *con*. The observations have been made by careful observers; and the most probable explanation of the diversity of the results reached, is that other circumstances have in some cases cancelled the bad effects of too close interbreeding, and in other cases brought them into prominence. A very fair consideration of the problem is given by Dr. G. E. Shuttleworth, in the *Journal of mental science* for October, 1886.

The common misgiving as to the propriety of cousin-marriages is of rather recent origin. In ancient times marriages of near kin were not forbidden; the first prohibition of them is in the fourth century A.D. The Church soon came to cast its odium on marriages even of the seventh degree of relationship, and the fees for removal of such objections by dispensation were an important source of revenue. This has undoubtedly influenced popular opinion on the question.

From the physician's point of view, the evidence from the animal world is important. Here there is almost a consensus, that, while the effect of 'in-and-in breeding' is to intensify *points*, in the long-run it is opposed to vigor of constitution. It is to be remembered that every breeder takes care to exclude any animals with any known morbid tendency, while, on the contrary, in the genus Homo, as Dr. Clauston remarks, there seems to be "a special tendency for members of *neurotic* families to intermarry." The result of this will be that in some portions of the population the offspring of such marriages will show the evil results of it to an unusual extent. And thus we find, that in rural and especially in mountainous districts, where the population is small and fixed, the comparative amount of idiocy is greater than elsewhere. Statistical information is inadequate on the subject: the motion to include it in the census returns of England was rejected "amidst the scornful laughter of the house, on the ground that the idle curiosity of speculative philosophers was not to be gratified." In France the returns have given rise to various estimates (varying from $\frac{9}{10}$ to $2\frac{1}{2}$ or 3 per cent) of the frequency of consanguineous marriages. Mr. G. H. Darwin came to the conclusion that in London $1\frac{1}{2}$ per cent of all marriages were between first-cousins, in urban districts 2 per cent, and in rural districts $2\frac{1}{4}$ per cent.

If, now, we ascertain the ratio of idiots and insane patients that are the offspring of such marriages to the total number of patients in the asylums, we will have some means of estimating the results of consanguinity. From quite an extended series of records, it is concluded that the ratio just referred to in the idiot-asylums is from 3 to 5 per cent: hence "*first-cousin* marriages, at any rate, are to some extent favorable to the production of idiot children." But this conclusion must be tempered by the consideration that in a large number of such cases of idiocy and imbecility other causes for this condition are present; and this consideration leads Dr. A. Mitchell to the opinion that "under favorable conditions of life the apparent ill effects of consanguineous marriages were frequently almost *nil*, while, if the children were ill fed, badly housed and clothed, the evil might become very marked." From such facts and figures we may conclude that first-cousin marriages should, as a rule, be discouraged; but that, if a close scrutiny reveals no heritable weakness, neurotic or otherwise, the banns need not invariably be forbidden.

ALLGEMEINE NATURKUNDE.

IN the production of elaborate works on natural science for the general scientific reader or student, the Germans are *facile princeps*. Besides bearing evidences of thoroughness and general accuracy, such works usually present a homogeneity and

Allgemeine naturkunde. Leipzig, Bibliographisches institut. 8°. (New York, Westermann.)