settlement of the western portion of Kansas will have a similar effect upon its rainfall; but it is not reasonable to expect that western Kansas will ever boast of a rainfall equal to that of eastern Kansas. So long as the eastern half of the state remains to the east of the meridian forming the western boundary of the Gulf of Mexico, the south winds will cause it to receive much larger supplies of vapor, for condensation into rain, than will be received by the western half of the state, which lies beyond the immediate track of the vapor-laden winds. It must be remembered that climatic changes are exceedingly gradual; and a rain deficiency or excess for a single year, or for two or three years in succession, must not be considered as invalidating the law of general averages. Neither should the fact that the rainfall, upon the whole, is increasing, induce settlers to break land in the western third of Kansas with the expectation of successfully raising the same crops as in eastern Kansas. Such settlers will surely be disappointed. It is even doubtful if paying crops of any kind can ever be continuously produced in that region. With an average before settlement of about fifteen inches per annum, the same percentage of increase as has been made in eastern Kansas in thirty years would give an annual amount of less than eighteen inches, — a quantity entirely inadequate to maintain successful agriculture.

AMERICAN SOCIETY FOR PSYCHICAL RESEARCH.

AT a meeting held in Boston, Sept 23, to consider the advisability of the formation of a society for psychical research in America, the whole matter was placed in the hands of a committee of nine, consisting of Dr. G. Stanley Hall of Johns Hopkins university; Prof. E. C. Pickering, director of the Harvard college observatory; Dr. H. P. Bowditch and Dr. C. S. Minot, of the Harvard medical school; Mr. S. H. Scudder, president, and Professor Alpheus Hyatt, curator, of the Boston society of natural history; Professor William James of Harvard college; Professor William Watson of Boston; and Mr. N. D. C. Hodges of Cambridge. This committee held a number of meetings during the months of October and November, and issued an invitation to a number of scientific men throughout the country to join in a society under a constitution upon which they had decided. To this invitation there were favorable replies from about eighty.

The first meeting of the society was held in Boston on the 18th of December. Under the constitution the conduct of the society is placed in the hands of a council of twenty-one, seven to be chosen each year, to hold office three years. Of this council, there were elected at this first meeting, fifteen: Prof. G. Stanley Hall, Prof. George S. Fullerton, Dr. William James, Prof. E. C. Pickering, for three years; Professor Simon Newcomb, Dr. C. S. Minot, Dr. H. P. Bowditch, Mr. N. D. C. Hodges, for two years; Prof. George F. Barker, Mr. S. H. Scudder, Rev. C. C. Everett, Mr. Morefield Storey, Professor John Trowbridge, Professor William Watson, Professor Alpheus Hyatt, for one year.

The sub-committee on work made an informal report, and has since issued a circular to members, asking for volunteers on the investigating committees and for information regarding promising subjects for investigation, such as mediums, mind-readers, mesmeric subjects, etc.

The society adjourned to meet on the ninth day of January.

THE NATURAL BRIDGE OF VIRGINIA.[1]

DURING a recent trip to Virginia (Oct. 2 to 6) I visited the Natural Bridge ; and although in possession of the guide-book of the locality (edition of 1884), and the admirable articles published by Major Jed. Hotchkiss in *The Virginias*, I failed to obtain certain information relating to the bridge, which would be of special interest to the topographer and geologist. Some of the observations which I made, although of a general character, may be of interest.

The bridge is undoubtedly the remnant of the top of a cave which was probably formed long before the Luray cavern, which is excavated out of the same lower Silurian limestone formation. The bridge seems to be located in the centre of a gentle basin or synclinal in the strata, which may account for the roof of the ancient cavern being left at this special point. The height of the bridge has evidently been much augmented by a lowering of the bed of Cedar Creek through the agency of chemical and mechanical erosion after the destruction of the original cavern. The height of the original cavity, at the point where the bridge now exists, was in consequence very much less than the present height of the intrados of the bridge-arch.

The elevation of the railroad-track at Natural-Bridge station, on the Shenandoah valley railroad, is seven hundred and sixty feet above ocean-level; and the elevation of Cedar Creek, under the north face of the bridge-arch, is nine hundred and fifteen feet, as determined by two independent lines of barometric levels which I ran between the railroad-station and the bridge.

The height of the crown of the arch on the north side, at the 'Lookout Point,' is one hundred and eighty-eight feet above the creek, measured with a cotton twine, which was the only line of the required length which could be obtained. The same height measured by the barometer (Short & Mason aluminum aneroid) was determined as one hundred and eighty-six feet. Neither of these methods of measurement is sufficiently exact to permit of a final statement, but the results are of interest in the absence of more definite data.

The thickness of the arch under the crown on the north side is approximately forty-six feet, and on the south side thirty-six feet.

[1] Read before the American philosophical society, Oct. 17, 1884, by CHARLES A. ASHBURNER.

Much has been written and published about this natural bridge, since the appearance, a century ago, of a description of it in the 'Travels of the Marquis de Chastellux in North America in 1780–82;' but there appears to be a lack of a complete description of the bridge and its surroundings, which is readily available, and which would prove of special value to the topographer and the geologist.

HEREDITARY INTELLECT AND THE GEOGRAPHICAL DISTRIBUTION OF TALENTS.

There is hardly any subject more fascinating to men of intellectual pursuits than that of biography. Within the last few years we may almost assert that the foundations have been laid for a science of comparative biography which promises to be not only interesting as a branch of inquiry, but of practical importance to all who are engaged in the education of youth and the advancement of science. The writings of Galton, Ribot, James, and others, have shed a great deal of light upon the influences which tend to produce intellectual distinction; and, if investigations of this kind are far from being so comprehensive or so exact as would be desirable, they are, to say the least, suggestive and stimulating. To books of this class belongs the treatise which is named above. The volume is worthy of a much more extended and critical review than we can now give; but, having received an early copy of it, we bring it at once to the attention of our readers.

Eleven years ago Alphonse de Candolle, the celebrated botanist, who succeeded to the chair of his renowned father in the Academy at Geneva, and to the place of a foreign member of the French institute made vacant by the death of Agassiz, published a history of the modern sciences and of scientific men during the last two centuries. The work has long been out of print. Its venerable author, more than seventy-eight years old, has now issued a revised edition of this work, enlarged by more than a hundred pages of new material. Some portions of the original edition (particularly a defence of Darwin's theory of natural selection, which seemed to the author no longer called for) have been omitted, and in place thereof some new researches in respect to heredity in the human species have been introduced. By what he calls his new method, the author endeavors to distinguish in the facts of birth those which come from heredity, and those which are for the first time manifested in a family, and which may be considered as individual variations. These characteristics, and those developed after birth by exterior influences, determine the adaptation of the individual to the circumstances in which he is found; that is, to his environment.

De Candolle has now carried his inquiry beyond the ranks of those who are commonly called scientific men, — the students of mathematical and natural sciences, — and has made a study of those who are devoted to moral and social sciences.

It is not generally known how well he is fitted for both these lines of investigation. His career has been that of a botanist, but he began life by the study of law; twice he has been a member of constitutional conventions, and repeatedly of legislative bodies. We need say no more to assure the reader that this new edition of his history is fresh, suggestive, and instructive. If all its reasonings are not accepted, the student of comparative psychology must be grateful for the light which it sheds upon one of the most difficult, interesting, and important inquiries which can be made in respect to the intellect of man.

His new method, as he terms it, is this, — to select, without any preconceived notions, a certain number of individuals whose personal characteristics can be ascertained, and those of their parents and grandparents. The characteristics to be noticed are these: 1°, exterior physique; 2°, internal organs, so far as they can be judged without autopsy; 3°, instincts or native disposition; and, 4°, intellectual faculties. Having collected the facts, the influence of heredity can be approximately ascertained. The author first thought of studying the family of some sovereign, — Louis XIV., Frederick the Great, or some one else of whose ancestry there are abundant records; but he finally determined to study his own family. Being seventy-eight years old, he playfully says that he knows himself quite well. Of his parents and grandparents, all of whom lived to be more than sixty years old, he has a good recollection, supplemented by letters, memoirs, and portraits. He then noted in his subject 'A' sixty-four characteristics, of which he found sixty-three in one or both his parents. He extended his observation to thirty other individuals belonging to sixteen families; and in the entire group of thirty-one persons he was able to enumerate 1,032 characteristics of which he was able to state their presence or

Histoire des sciences et des savants depuis deux siècles. Par Alphonse de Candolle. Deuxième édition, considérablement augmentée. Genève-Bale, *Georg*, 1885. 594 p. 8°.