in your article. But no scientist would venture categorically to affirm, without investigation, the correctness of such a hypothesis, as is done in your columns when you state that the valley is due to heated rocks which

> turn to instant steam the spring and drainage waters of many a surrounding mile of foothills. Thus originates the steam which bursts forth from the myriad valley vents. The phenomenon is familiar in the neighborhood of most volcanoes which still are classed as active. Steaming springs, a later stage of the vents in this valley, are found upon the flanks of several of the most prominent of our Cascade volcanoes, and are numerous around the base of Lassen Peak.

Now, as a matter of fact, there is no evidence that the vents of the Ten Thousand Smokes have any connection with the vaporization of surface drainage. The writer gives strong reasons for the belief that they are, on the contrary, true volcanoes in an article entitled "Are the Ten Thousand Smokes Real Volcanoes?"[1] There is not space to give the evidence here, but some of the facts which lead to that conclusion may be summarized.

1. The disposition and magnitude of the vents are such as to make them very difficult to explain on the surface water hypothesis.[2]

2. The temperature of all the larger vents in the valley is far above that of ordinary steam. The expedition of 1918 measured many temperatures above 300° C., while the highest was 432° C. Curiously enough the "smoke" from a number of these vents is hotter at the surface of the ground where it meets the cold atmosphere than it is a few feet down the throat. In one case where the temperature is 352° C. at the surface it is only 245° C. three feet down in the throat—a difference of 107° C.[3]

3. The smoke from the vents is by no means all water vapor. It includes many other volcanic gases. Most notable among which is perhaps hydrofluoric acid in such high concentration as to etch the glass on the inside of the vacum tubes which were used for collections. Dr. E. T. Allen, of the Geophysical Laboratory, who has made a preliminary examination of the deposits, has informed me also that the incrustations around the vents are rich in fluorides. The chemical study of the gases, undertaken by Dr. E. S. Shepherd, of the same institution, would probably have been completed by this time if it had not been interrupted by the diversion of chemists to war problems.

4. The Vents of the Ten Thousand Smokes are by no means secondary openings consequent upon the eruption. On the contrary, they are associated with an extraordinary deposit of fragmental material poured out *before* the explosion of Katmai. This deposit is described in detail in the third of the papers giving the scientific results of the expeditions.

There are still very many problems to be worked out in connection with this remarkable district but even now it may be asserted with confidence that the Valley of Ten Thousand Smokes is no secondary phreatic phenomenon but on the contrary is a true manifestation of the forces of volcanism of a character and magnitude unparalleled in the present day world.

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[1] "Scientific Results of the Katmai Expeditions of the National Geographic Society, II," *Ohio Journal of Science*, December, 1918.

[2] For details see paper cited.

[3] The studies of temperature upon which these statements are based will be given in full in the fifth number of the "Scientific Results of the Expeditions," which is in press.

HEREDITARY DEFICIENCIES IN THE SENSE OF SMELL

IN a recent number of SCIENCE, Professor Glaser[1] has recorded a family history which is supposed to show inheritance of deficiencies in the sense of smell. There are certain modifying conditions, not considered in estimating the history, which should be kept in mind in analyzing this case in particular, as

[1] SCIENCE, N. S., Vol. XLVIII., p. 647, December 27, 1918.

well as the inheritance of various degrees of anosmia in general.

"The case in point is that of a young Russian Jew, a fugitive from Kiev." This individual from Glaser's description presents a definite case of anosmia. He is devoid of powers of olfaction, though possessing a sense of feeling in certain regions of the nasal epithelium due to the presence of normal trigeminal endings.

The family of which he is a member has certain degenerate characteristics, which probably result from diseased conditions, since he is from a region in which syphilis and other diseases are extremely prevalent. There is much stammering; early loss of incisors (indicating epithelial infections); unusually wide thumbs; "considerable mental powers," though doubtless morbid as shown by "excessive sex interest," etc. In this family there are "several individuals abnormal in their sensitivity to odors."

It so happens that two sisters are reported to have a normal sense of smell, though it is not indicated whether this diagnosis is based on their own statements or on some form of examination. At least such conclusions only approach desired accuracy when based on simple measurements with an ordinary olfactometer. One brother has complete anosmia and another is said to exhibit the condition to a certain degree. The mother of these sibs and her father were reported as cases of complete anosmia. Such reports, Glaser believes, show 'offhand, certain resemblances to sex-linked inheritance." There was also "smell-blindness" (an unfortunate expression used by Blakeslee[2] and going dangerously well with sex-linked inheritance) in certain members of a collateral line.

After inquiries the young man examined by Dr. Glaser finds that the defect is "inbred" in the locality from which he comes "so that quite a number are afflicted with it."

I am certain that Dr. Glaser will pardon me for taking the liberty of questioning the value of this record from a genetic standpoint, and of pointing out certain serious objections to it.

In Poland, parts of Russia around Kiev, Galicia and Hungary it is well known that the serious disease rhinoscleroma, first described by Hebra in 1870, is endemic. Such a disease readily destroys the olfactory epithelium beyond repair. Rhinoscleroma does not occur in the United States except among immigrants from the above regions; several cases have been described by Emil Mayer[3] in New York City. In addition to this marked disease, various forms of chronic rhinitis causing congestion and fibrous thickening of the nasal epithelium are extremely common among Russian Jews, as well as other races of Russian and Poland. Nasal polypi actually modifying the form of the external nose and also causing anosmia are common. Several of these diseases and catarrhal conditions occur somewhat more frequently among men than women owing to greater exposure to colds and general nasal infections.

My attention has frequently been attracted to these facts during a number of years' experience in the anatomical dissecting room. One often notices among Russian Jews a lack of the sense of smell to such a degree as to be unable to detect the ordinary strong odors of embalming fluids, etc. Many such persons have chronic rhinitis or other affections of the turbinal regions which tend to destroy or cover over the olfactory epithelium of the upper nose, causing a loss of the sense of smell even when very young.

It would seem rather probable that the family described by Glaser presents anosmia among its members as a result of diseased conditions. Evidence derived from the prevalence of even rhinoscleroma along with many ordinary nasal affections, in the region from which the examined man came, also points more directly to disease as an explana-

[2] "Unlike Reactions of Different Individuals to Fragrance in Verbena Flowers," Science, N. S., Vol. XLVIII., p. 298, September 20, 1918.

[3] "Scleroma of the Larynx," *Am. Jour. Med. Sci.*, N. S., CXXXIII., p. 751, 1907. "Rhinoscleroma in North America," *Laryngoscope*, December, 1908.

tion of the number of persons exhibiting anosmia in this community, than to some form of inheritance.

I wish in no way to be understood as opposing the belief that deficiencies in the sense of smell may be inherited in human beings. On the contrary, it seems certain that defects in the sense of smell must be inherited, since this sense in man is so degenerate as to be vestigial in function, often strangely one-sided in its manifestations, or even completely wanting. The extent to which the sense is developed varies greatly among individuals. Many persons with apparently normal olfaction are actually unable to appreciate certain particularly pungent odors such as those of violets, or hydrocyanic acid, etc.

In deciding the cause of deficient olfaction it is most important to recognize the favorable location for exposure to disease of the olfactory epithelium. Any attempt to determine the manner of inheritance of the different degrees of anosmia, therefore, must necessitate a careful examination of the nasal epithelium in all so-called abnormal individuals in order to detect the vitiating effects of disease.

In heredity studies of no other sense would such considerations be more important than in investigations based on the degree of efficiency of the sense of smell. Diseases of the nasal epithelium are often but slightly contagious thus affecting only certain members of a family, and on account of greater exposure, more probably the male members, as in the family now considered. Some diseases of the nasal passages as rhinoscleroma are endemic in certain regions and might cause secondary conditions which would seem to be "inbred" in the community.

Anosmia is known among women as well as among men, though probably more often in the latter. Until, however, there is statistical evidence indicating a decided preponderance of the defect in one sex, when not the direct result of disease, there is no reason in the absence of further genetic data for assuming the condition to be sex-linked in inheritance. Anosmia is in no way comparable to color-blindness as the expression "smell-blindness" might suggest. It is comparable only to defective sight or actual blindness when this is due to either retinal, nerve, fiber-tract, or cerebral center deficiency.

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QUOTATIONS

THE ORGANIZATION OF RESEARCH IN GREAT BRITAIN[1]

THE Committee of the Privy Council for Scientific and Industrial Research has published its third annual report (for the year August 1, 1917, to July 31, 1918).[2] Practically it is a new government department which administers the Imperial Trust for the Encouragement of Scientific and Industrial Research. During the last financial year the committee expended £30,825, and it is convinced that the value to the nation of the work done is beyond all comparison greater than the cost, and will, as time goes on, bring continually augmented returns, for the garnering of the harvest of research is sure though slow. The estimated expenditure for the current financial year is £163,350, which includes a sum of £89,750 for the National Physical Laboratory. In addition, the laboratory is rendering services to the several war departments, which will be met out of the vote of credit, at an estimated cost of £74,100. The grants in aid of industrial research associations will be met out of the fund of one million held by the Imperial Trust.

The report by the Advisory Council, of which Sir William McCormick is chairman, and Sir Frank Heath, K.C.B., secretary, gives an account of the progress made in the establishment of these associations and the steps that have been taken in the organization of national research. Some thirty industries are

[1] *British Medical Journal.*

[2] "Report of the Committee of the Privy Council for Scientific and Industrial Research for the Year 1917–18." H.M. Stationery Office. Price 4d. net. (Cd. 9194.)