tion was due to the rust, the uredo stage of which was just beginning to make its appearance. The specimens were put away and were not again examined until a short time ago when it was decided to make a proper identification of them. When they were taken it was our intention to revisit the fields and collect the teleuto stage, but owing to press of other work this was not done. When a reexamination of the material was made we found it impossible to determine the species and a sending was therefore made to Mrs. Flora W. Patterson, mycologist, U. S. Department of Agriculture, Washington, D. C. The tentative opinion of the writer, that the rust in question was none other than *Puccinia glumarum* Eriks. and Henn., has been confirmed both by Mrs. Patterson and the pathologists in the Cerealist's Office at Washington.

Just two days previous to our finding this rust, Dr. F. Kolpin Ravn, of Copenhagen, Denmark, Mr. A. G. Johnson, of the University of Wisconsin, and Dr. H. B. Humphrey, of the U. S. Department of Agriculture, visited the Salt Lake Valley and were undoubtedly on the lookout for this rust which was seen for the first time in this country at Sacaton, Arizona.[1] The writer had the pleasure of entertaining these gentlemen during this visit, making with them a short automobile tour about the valley in the interest of cereal diseases.

The rust infection due to *Puccinia glumarum,* as noted in the Salt Lake Valley, is undoubtedly of greater economic importance than had hitherto been supposed. It is not known to what extent the wheat crop was injured, but it is the writer's opinion that the loss over a considerable area must have been quite heavy if the extent of the infection could be taken as a criterion. During the present season careful notes will be made on the occurrence, distribution and effect of this rust on wheat in the Salt Lake Valley and adjacent districts.

P. J. O'GARA

DEPT. OF AGRI. INVESTIGATIONS,
AMERICAN SMELTING AND REFINING CO.,
SALT LAKE CITY, UTAH,
June 10, 1916

[1] SCIENCE, N. S., Vol. XLII., No. 1071, p. 58.

IS INHERITANCE MODIFIED BY ACQUIRED CHARACTERS?

IN the *American Naturalist* for August, 1916, I find an interesting article by Dr. C. B. Davenport, on "The Form of Evolutionary Theory that Research Seems to Favor." The general result of his investigation is "that the course of evolution is chiefly determined by internal changes," that is, by genetic changes. He, however, reminds us that "there is some evidence . . . that the germ plasm is not beyond the reach of modifying agents. At least we must continue experimental efforts in that direction."

The question which I wish to raise is whether attention has been given to the book by Walter Kidd, entitled "The Direction of Hair in Animals and Man," published by Adam and Charles Black, London, 1903. On pages 76 and 81 will be found pictures showing the difference in the arrangement of hair on the head of the chimpanzee, and that found on the heads of many young human subjects, who seem to have inherited some of the new arrangements through the influence of the artificial parting of the hair, practised by their ancestors for several generations. If these pictures correctly represent inherited conditions, it seems impossible to attribute them to spontaneous variations, uninfluenced by habit, and preserved simply because they gave their subjects superior power in the struggle for life, or because of any other form of selection.

For several years failing eyesight has restricted, not only my own investigations, but my knowledge of what others have accomplished; and I shall be thankful for any information as to whether these points have been discussed in the *American Naturalist,* or in any of our scientific journals.

JOHN T. GULICK

HONOLULU, T. H.

TUMORS IN PLANTS

AT last I have succeeded in producing small tumors in plants without the use of the crown gall organism (*Bacterium tumefaciens*), *i. e.,* simply by means of substances which are by-

products of the bacterial growth. The tumors though small have been obtained repeatedly on several kinds of plants and there seems to be no reasonable doubt that they are due to the fleeting chemical stimulus which I have applied. Judging from my experiments, which have been continued for some months, the mechanism of tumor growth appears to be wholly one of changed osmotic pressures brought about by the metabolism of the tumor parasite. A full paper will be published as soon as I have finished studying my serial sections and have had time to make suitable photomicrographs to illustrate it.

Erwin F. Smith

U. S. Department of Agriculture,
Washington, D. C.,
October 17, 1916

QUOTATIONS

THE OPTICAL INDUSTRY IN FRANCE

A series of articles by various authors has recently been appearing in the *Revue générale des Sciences* on the methods to be adopted for the development of French trade after the war. Amongst these have appeared two articles (May 30 and June 13) by M. A. Boutaric on the French optical industry and its future.

He points out that before the Napoleonic wars France had been dependent on England for its optical glass, and it was as a result of the British blockade that its manufacture was commenced in France.

At the present time the house of Parra-Mantois manufactures practically all the special optical glasses made by Schott and Co., and the French makers undoubtedly are more successful than their competitors in the manufacture of the glass discs required for very large astronomical mirrors and objectives. In every branch of optical science French physicists have invented instruments and methods for testing their qualities, but the French manufacturers have not done themselves justice by an efficient catalogue propaganda. M. Boutaric, when referring to the firm of Zeiss, mentions especially that it "has surrounded its products with a scientific propaganda." He shows how severe the German competition in microscopes was before the war, although there are two good French makers—Nachet and Stiassnie. The metallurgical microscope of Le Chatelier has been developed by Pellin with considerable success. The polarimeter in its present commercial form was developed by the French makers Soliel and Laurent, and is essentially a French instrument, yet the German houses have almost obtained a monopoly in the sale of the instrument outside France.

The manufacture of binoculars is the most successful of all the French optical industries, several large firms (Balbreck, Baille-Lemaire, Société française d'Optique, Société des Lunetiers, etc.) being employed in their manufacture. As showing the large quantity of optical glass used in these glasses, it is stated that the Société des Lunetiers alone use about 200,000 kilos of glass annually.

Although French makers showed several prism binoculars of the Porro type at the 1867 Exhibition, yet the manufacture of these glasses passed almost entirely to Germany. Now, however, glasses equal to the best German models are being made in France in large numbers for her army and those of her Allies. The original supremacy of the French photographic lens has passed away, because, in the opinion of M. Boutaric, the French makers did not use the new glasses and modern grinding methods, nor sufficiently avail themselves of skilled technical knowledge. M. J. Richard has developed with great skill and success a stereoscopic camera, the "Verascope," and also a very rapid camera shutter, but the majority of the cameras used in France have been imported. The kinematograph, the invention of a Frenchman, Professor Marey, has been carried to a high state of perfection by the firms of Lemaire, Pathé and Gaumont. To a certain extent France is dependent on outside sources for kinematograph film, but, on the other hand, she exports finished printed film to the annual value of £600,000. The lighthouse industry, built on the theoretical work of Fresnel, is a successful one, although it has had to face keen competition from English and German makers.