Harvard Observatory; January 14, "Man's Relation to the Earth," by Dr. Robert R. Shrock, assistant professor of geology at the Massachusetts Institute of Technology, and May 23, "Man's Relation to Other Men," by Dr. Kirtley F. Mather, professor of geology at Harvard University.

THE fifth annual symposium of the Division of Physical and Inorganic Chemistry of the American Chemical Society will be held in Havemeyer Hall, Columbia University, on December 30 and 31 and January 1. The general subject will be "The Structure of Molecules and Aggregates of Molecules."

THE Southern Section of the American Society for Horticultural Science will participate in the meetings of the Association of Southern Agricultural Workers to be held in Atlanta, Ga., from February 5 to 7. The program of the Southern Section will extend for a period of three days. On February 5 a conference will be held on the national sweet potato research program. On February 6 two symposia will be given, one entitled "Research with Tomatoes Grown in the South" and one other entitled "Research with Peaches." On February 7 a joint session will be held with the Soil Fertility Section of the American Society of Agronomy. Information may be obtained from Dr. J. B. Edmond, Clemson Agricultural College, South Carolina.

THE program of scientific and technical departments at the Rochester Athenaeum and Mechanics Institute in Rochester, N. Y., will be expanded and strengthened as the result of an endowment campaign of approximately $750,000. George H. Clark, Rochester industrialist, who offered to contribute two thirds of a dollar for every dollar pledged by the public before December 31, 1940, has given approximately $300,000. He offered to give $400,000 if $600,000 were raised from other sources. Three-year, post-high school courses are given at the institute in the industrial chemistry, electrical, mechanical, photographic technology, construction, food administration, home economics, applied art, retailing and publishing and printing fields.

DISCUSSION

DENTAL RESEARCH AT THE NATIONAL BUREAU OF STANDARDS

THE vital significance of the physical and chemical properties of dental restorative materials has, during the last twenty-one years, been amply demonstrated by a program of research at the National Bureau of Standards. The research was initiated by Souder and Peters in 1919, at the request of the War Department. The former, as chief of the bureau's dental reesarch laboratory, continues to supervise the research.

These men were able to show, through laboratory tests, defects in dental amalgam alloys, such as shrinkage and flow, in a large number of popular brands, which made it practically impossible for the dentists to place a filling which would give satisfactory service when these brands were used. As the research was extended to dental cements, gold alloys, denture resins and similar items, again many inferior trade brands were found indiscriminately assembled with and equally advertised with the superior brands.

The Weinstein Research Laboratories of New York City cooperated from 1922 to 1928 in the program of basic research. In 1928 the American Dental Association joined forces with the bureau. This was a most fortunate affiliation, as it permitted the extension of the research to include ample clinical tests by the association's members when and where desirable.

The first performance specification for a restorative dental material (dental amalgam alloy) was written by the National Bureau of Standards in 1925. With the assistance of the American Dental Association the number has been extended until there are now 12 such specifications. Each specification reflects the following influences:

1. Engineering principles involved in, and demands of typical dental restorations and appliances.
2. The suggestions and advice of representative members of the dental profession.
3. Information supplied by the manufacturers of dental materials.
4. A survey of the chemical and physical properties having a dental significance is conducted on each material.

The following items have been surveyed under the four-point program and are available to the dental profession, upon request, in specification quality: Amalgam, inlay casting investments, impression compound, inlay casting wax, inlay casting gold alloys, mercury, wrought gold wire alloys, zinc phosphate cements, silicate cements, denture rubber, hydrocolloidal impression materials and acrylic denture resin. These specifications are revised from time to time as new and improved materials are developed, thus enabling the dentist who demands specification quality always to be supplied with the highest quality materials available.

THE CERTIFICATION PLAN

The following plan was adopted to protect more completely the dentist in the purchase and use of materials and to guarantee the practical effectiveness of the specifications.

1. Following the adoption of a specification by the

American Dental Association its Research Commission invites the manufacturer to forward a formal certificate guaranteeing compliance of his product with the specification.

2. The manufacturer must also demonstrate to the Research Commission that he has adequate testing facilities and personnel and that he makes routine tests of his guaranteed products or makes use of a laboratory that does have such facilities for such tests.

3. The Research Commission procures in the open market a representative retail sample of the material which the manufacturer has guaranteed.

4. The sample is tested at the National Bureau of Standards to see whether or not it meets the association's specification.

5. If the material is found to comply with the requirements (items 1 and 2 having been met) the trade brand name is then placed upon a List of Certified Dental Materials.

This list is published from time to time in the *Journal* of the American Dental Association. Forty-five thousand dentists in the United States regularly receive these lists and are able to assure their patients as to the quality of materials they are using. Progressive manufacturers of these dental materials have gladly cooperated with both the Bureau and the Association in making the plan effective.

Since the work was started, approximately 100 reports have been printed. These reports have unquestionably had a salutary effect upon the production and use of dental materials. As a specific example one needs only to cite the effect of the technical reports and the specification for zinc phosphate cements. These publications caused, within one year after their appearance, the modification of practically every cement of this type which was manufactured in the United States. Manufacturers took the necessary steps to make their cements more uniform, less soluble, stronger, finer grained and more nearly free of arsenic.

Thus it can be seen that the foregoing cooperative research and supervised certification policy have been very effective in promoting the use of highest quality materials and in stimulating the testing of and research on dental materials both in dental schools and in manufacturing establishments. The program has been found mutually useful to the manufacturer, to the dental profession and to the public. It is believed that similar programs would work equally well in other fields, as they furnish a direct approach between the responsible manufacturer and his customers and a maximum of protection to the public.

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CONTROL OF PRICKLY PEAR IN AUSTRALIA

IN a recent publication[1] issued by the Imperial Bureau of Pastures and Forage Crops at Aberystwyth, Great Britain, among other matters there is an account of successful control of prickly pear in Australia through the introduction of insect enemies.

Various species of prickly pears (genus Opuntia of the Cactus Family) have been wide-spread weeds in Australia, where they were introduced from North and South America—*O. inermis* prior to 1839 and *O. stricta* about 1860. First planted for hedges and as a possible source of fodder these plants spread, until by 1925 over 60,000,000 acres were affected. About half of this area was occupied by a dense growth to a height of two to five feet, covering the ground to the exclusion of grass and herbage; the remaining 30,000,000 acres of infested land had great patches of prickly pear alternating with native vegetation.

The cost of eradication by chemicals or by mechanical means, digging or plowing, stacking and burning would have been about $50.00 per acre, while unaffected land adjacent was valued at only $2.00 to $5.00 per acre. Hence, year by year more land was abandoned, and holdings and homesteads deserted.

In 1920 the governments of the Commonwealth and of New South Wales and Queensland established the Prickly Pear Board to combat the infestation. Agents were sent to North and South America to study the diseases of prickly pears, but it was soon found that bacterial and fungous diseases offered little promise. Attention was then directed to insects attacking plants of the Cactus Family, and stations for study were established in many parts of the American continents; these stations were maintained either continuously or intermittently from 1920 to 1937. Insects which were discovered to feed upon prickly pears were fully studied, and when found not to attack plants of economic value were collected and shipped to Australia. There, in quarantine, they were tested again. About 150 species of insects restricted to cactus host plants were discovered, but only 15 were sufficiently promising to warrant their employment. They included the moth borer *Cactoblastis cactorum* from Argentine and Uruguay and other moth borers, besides species of cochineal insects, beetles, red-spider and two Coreid bugs. Following much experimentation there came the large-scale rearing of successfully acclimatized insects, their establishment in the field and later their mass distribution.

During the last ten years *Cactoblastis cactorum* has proved the chief agent for destruction of prickly pear; other insects introduced earlier were of some value,

[1] Herbage Publication Series, Bulletin 27, "The Control of Weeds."