great, in addition to large quantities sent by caravans to centers in the north and to ports for export to the United States and Europe.

Uses.—Although the tree is limited in its distribution, its seed has long been known to the natives throughout the vast continent of Africa, not only as an article of trade, as a medium to consummate contracts and sales, and for use in civil and religious ceremonies, but also for the superlative stimulating and medicinal properties attributed to it. To the African Negro, the white seed signifies peace and friendship; the red denotes war or opposition. He believes that the seeds possess properties capable of purifying contaminated water, and the pulp and ground seeds are used to clarify turbid water. It is claimed that on a daily ration of 40 grams of powdered seeds a man is able to climb steep mountains or perform strenuous menial work exposed to the intense tropical sun and to live for long periods on frugal meals without suffering any feeling of hunger or exhaustion. The natives are known to subsist entirely on these seeds in times of scarcity of other food plants.

To what substances can these stimulating and therapeutic properties of the cola nut be ascribed? Chemical analyses of the seeds reveal that the active principles causing these physiological and stimulating properties are similar to those found in coffee, tea, and cocoa—namely, *caffeine*, the alkaloid present in coffee, and *theobromine*, the active principle in cacao beans—or represent other constituents not found among these, such as *kolatine* and *betain*, a non-toxic alkaloid found in beet and other plants.

The present uses of cola nuts in the United States and elsewhere are many. As is well known, cola nuts are used on an increasing scale, in admixture with cocoa and other ingredients, to prepare an extract for refreshing drinks. They are also used in the manufacture of tonic wines and liqueurs, confectionery, and certain medicinal preparations.

Specimens of cola nuts are on exhibition, along with other plant materials used for stimulating beverages, in Case 54 in the Hall of Food Plants (Hall 25).

NEW MEMBERS

The following persons became Museum Members between July 15 and August 14:

Associate Members

Adam Hefner, W. Lynwood Smith

Sustaining Members

Mrs. Helen Horton

Annual Members

Aaron L. Balter, Mrs. Marion Herbert Barker, James E. Burke, Theodore M. Caiazza, Glenn A. Clark, Dr. James Wilson Clark, George J. Cullinan, Charles S. Downs, James J. Fitzpatrick, Clarence E. Fox, Fred M. Friedlob, Edward G. Gantner, S. M. Guthenz, Carroll Rede Harding, R. G. Haynie, Benjamin Keach, Victor R. Kendall, D. H. Kinnett, Wilson O. Koehnlein, Lazarus Krinsley, Harry W. Krotz, Jr., Harley B. Langan, Francis L. Lundy, Mrs. Walter G. Maddock, Michael H. Mannion, George J. McDuffie, Mrs. Howard C. Meadors, Morgan F. Murphy, Christopher D. Norton, Frederick J. Price, M. D. Reber, G. B. Rockafellow, Dr. Edwin S. Sinaiko, Albert H. Singer, Bernard H. Traut, Dr. James M. Wall, Earl J. Witt.

U. S. LEAD AND ZINC SINCE THE WAR

By ROBERT KRISS WYANT
CURATOR OF ECONOMIC GEOLOGY

In spite of the termination of wartime demands there remains an increasing need for many of our natural resources. This is particularly true of lead and zinc. Before World War II the annual production in the United States of lead and zinc was greater than domestic consumption, thus making exportation possible. During the war, however, demands far exceeded the resources available and large importations were necessary.

Although opinion differs widely as to the length of time required for the depletion of any particular resource, it is agreed that many of our lead and zinc ore deposits are nearing exhaustion. In view of this fact, new and enlarged ore bodies must be discovered for future use or we shall be in part dependent upon foreign sources for our post-war needs of lead and zinc.

Man has used lead for a very long time. The Chinese used it for coins as early as 2000 B.C. Metallic zinc was unknown until mediaeval times.

Geologically, lead and zinc deposits are often similar and the minerals are commonly associated with each other. The bulk of the world's supply of these metals is derived from the sulfides, galena (lead sulfide) and sphalerite (zinc sulfide) or their oxidation products. The economic geology section of Hall 36 contains a systematic lead and zinc exhibit.

Modern uses of lead and zinc are very numerous. The principal uses of lead are for storage batteries, cable covering, and pigments. Galvanizing and brass making consume the largest amounts of zinc. There are few economical substitutes for lead and zinc.

The United States produces annually approximately one-third of the total world's supply of lead and zinc. The Tri-State District—Oklahoma, Missouri, and Kansas—leads in production in the United States. Other domestic production is derived from smaller deposits in twenty-one other states and Alaska, but all of these do not produce both lead and zinc. Foreign deposits are located in Australia, Canada, Mexico, India, Burma, Germany, Belgium, and Russia.

Present-day consumption of these metals is high. If the United States is to retain a high degree of freedom from importation of these metals, it is expedient that additional sources of lead and zinc be found by geologic exploration. Also these resources must be developed by the best technical methods, rather than by uneconomical procedures used at times in the past.

Intelligent geological exploration for lead and zinc should be encouraged. Because the more obvious deposits have been found, every clue must be examined in an effort to locate entirely new deposits. Detailed geologic examination of known deposits with a view to extending present ore bodies and locating new ones is also necessary.

The "tools" of such exploration, in addition to conventional geologic methods include the use of:

A. Geophysical methods;
B. Surface and underground exploration with diamond drills;
C. Geochemical investigation of the occurrence of traces of lead and zinc in outcrops, soils, ground water and in vegetation.

All possible modern technical methods should be used to alleviate future shortages. Such methods are:

A. Improved metallurgical methods including better grinding and improved furnace design and efficient electrolytic refining;
B. Retreatment of tailings and scrap;
C. Use of lower grade ores;
D. Development of substitutes, such as the use of titanium oxide in pigments;
E. Improved mining methods.

MISSOURI LEAD-ZINC MINE

The Oronogo deposit near Webb City. The underground workings of this mine extend several miles.

Examination of present reserves indicates that a partial dependence upon foreign resources soon may be necessary.

Zinc production in Mexico, Canada, Peru, Australia, and Bolivia has been expanded in the last few years. Many factors, such as operating costs, taxes, and political situations, of course affect this production. On account of wartime construction of zinc refineries, the United States is in a favorable position to refine most of the domestic and foreign zinc concentrates required.