

# Everglades Geological Society

# BULLETIN

Volume 4, Number 6

February 1998

## Gold Ore Deposits Robert S. Caughey

A brief discussion of the geology & genesis of the major gold deposits of the world will be presented. Deposits discussed will be Witwatersrand of South Africa; Carlin-type, sediment hosted gold deposits; Homestake-type gold deposits; porphyry copper-gold related deposits; low-sulfide-quartz lode type (Mother Lode); shallow volcanic hosted gold deposits (Comstock/Hot Springs), & possibly others if time permits.

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**Everglades Geological Society**  
**P.O. Box 61684**  
**Fort Myers, FL 33906**

The Everglades Geological Society is an organization which seeks to promote interest in and understanding of Geology and the related Earth Sciences, and to provide a common organization for those individuals interested in geology and the related earth sciences.

The Bulletin is a monthly (September-June) publication of the Everglades Geological Society, Inc.

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Everglades Geological Society  
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## PRESIDENT'S MESSAGE

Dan Acquaviva

The Nominating Committee was rounded up one day last week and transported via Mosquito Control helicopter to a remote hammock deep in the Everglades. There they were locked in a windowless room, equipped with a table, two chairs, and a cellular phone (without a battery charger) to commence their deliberations.

With a membership list, a package of stale peanut butter crackers, and a half bottle of 20 year old Strawberry Ripple as their only tools, they were to begin their deliberations. Since we haven't heard from them in several days, we fear they may be having some difficulties.

According to EGS bylaws, the Nominating Committee can't return to civilization until their task is completed. So, if you get the call asking you to be a candidate, please just say yes and let these illustrious individuals come home.

Dan

### E.G.S. FIELD TRIP

The Everglades Geological Society will be holding a field trip for fossil collecting on **Saturday, March 21, 1998**. IMC has graciously consented to allow our members to collect fossils at their Four Corners Mine near the corners of Manatee, Hardee, Hillsborough, and Polk Counties. Attendees are to assemble at the entrance to the mine at 9:30 a.m.

To get to the mine, take I-75 north to Exit 43, go east on US Highway 301 to Parrish, then east on State Road 62. Take SR 37 north to the mine entrance. Travel time from Fort Myers is about 1½ hours. In the interest of safety, IMC requests that *no shorts or sandals* be worn, and *no children, please!* A release from liability must be signed upon arrival at the mine.

IMC advises that a clay pit at the mine is currently being excavated, revealing many fossilized teeth and bones, so the collecting should be good! Contact Duane Dungan at (941) 277-0003 if you plan on attending so that we can have a good idea of how many people are going.

## Gold Mining in the 1990s

In the last 6,000 years over 125,000 tonnes of gold has been recovered, first from alluvial deposits in rivers and then by mining. But most of it has been produced in the last 150 years, since the major discoveries in the United States and Australia in the mid-19<sup>th</sup> century. Then, in the short span of 50 years, more was mined than in the preceding 6,000. Today, world-wide production amounts to about 2,300 tonnes annually, having doubled since 1980 due to higher prices and new technology. Although gold is mined in almost sixty countries, the following are the major producers.

### South Africa

Gold was discovered by George Harrison on Langlaagte farm near Johannesburg in February 1886. Soon, South Africa was the world's premier producer, a position that it has held almost continuously ever since. In just over a century, more than 45,000 tonnes of gold have been mined in South Africa, about 40% of all gold ever produced. The gold was found in an arc of "reefs" stretching from 40 miles east of Johannesburg to 90 miles west, then swinging down to the Orange Free State 200 miles south-west. The reefs vary in thickness, and slope in towards the centre of the arc to depths of at least 5,000 metres. Since gold is buried deep underground, new mines are expensive and take over five years to bring into production.

The peak year for production was 1970 when output topped 1,000 tonnes. Since then it has fallen to around 550 tonnes (under 25% of world output), but South Africa is likely to remain the foremost producer into the next century.

### United States

The California gold rush began in January 1848 after the discovery of gold in the tailrace of Sutter's Mill in Sacramento Valley. Almost half a million prospectors swarmed to California, helping to open up the American west. But output peaked temporarily in 1853. Thereafter production waned and, apart from a brief resurgence in the 1930s, declined to 30.5 tonnes by 1980, when the high gold price, coupled with new production techniques, revived the industry. By 1995 output reached 329 tonnes, 60% from the state of Nevada. The richest deposit is the Carlin Trend with over 30 open-pit operations, of which the largest is Goldstrike with an expected average production of over 50 tonnes per year.

### CIS

Historically, Russia was one of the earliest sources of gold. Alexander the Great conquered Armenia in 33 BC in order to obtain its gold, but a discovery in the Urals in 1774 triggered the modern industry. By the 1840s Russia was the

leading producer, until eclipsed by the California gold rush. After the Revolution, Stalin encouraged mining and the Soviet Union was the second biggest supplier until overtaken by the United States in 1991. Overall Soviet production peaked at 285 tonnes in 1989, before falling to about 250 tonnes in 1991, of which some 150 tonnes was from Russia itself. Important new mines are being developed in Kazakhstan and Uzbekistan.

### Australia

Gold was first discovered in Australia in 1851 near Bathurst, New South Wales, transforming it from a mere penal colony. Output peaked in 1865 at 95 tonnes, but fortunes revived with discoveries at Kalgoorlie, Western Australia, in 1893. The second rush, focusing on the diggings along Kalgoorlie's famous "Golden Mile", lasted a decade. By 1903 output had risen to 199 tonnes, a level not surpassed until 1988. The gold boom of the 1980s changed everything. The revival focused on Kalgoorlie. The "Golden Mile" is being worked as one immense crater whose yearly output is close to 20 tonnes. Australian output in 1995 was 254 tonnes of which 75% came from Western Australia.

### Canada

Canada only became a serious producer with the discovery of gold in the Klondike tributary of the Yukon River in 1896. 75 tonnes of alluvial gold was recovered in the first three years. The future of the industry, however, lay underground in the Pre-Cambrian shield that blankets northern Ontario and Quebec, which provides over 80% of Canada's gold output.

The first mine, Dome, opened in 1909 and is still operating. The price rise to \$35 in 1934, stimulated production to 172 tonnes in 1941. Thereafter mining declined; by 1978 only 50 tonnes was produced. The industry revived in the 1980s with the discovery of the Hemlo deposit in northern Ontario.

Three mines are operating at Hemlo and producing 35 tonnes annually, with the Williams mine alone accounting for 15.5 tonnes. Hemlo helped output to a record 175 tonnes in 1991, but it has since declined. The only major new deposit is Eskay Creek in British Columbia.

### Latin America

Gold was recovered from alluvial deposits in the Andes as early as 1000 BC. However, significant production did not begin until the 18<sup>th</sup> century with discoveries in Brazil. The Mineracao Morro Velho mine in Minas Gerais opened in 1835 and is the world's oldest continually worked mine.

Brazil's output soared in the 1980s from alluvial deposits in the Amazon basin; the richest was Serra Pelada, hill of gold, from which 13 tonnes was excavated by thousands of garimpeiros (prospectors) in a single year. Total production

has stabilized at around 75 tonnes annually, of which half comes from formal mines, the rest from garimpeiros at alluvial deposits. The rest of Latin America is the focus of much exploration and investment by North American and South African mining companies, which has pushed overall annual output towards 280 tonnes.

Chile has low grade deposits high in the Andes, including El Indio and La Coipa. Bolivia has a new mine at Kori Kollo; Guyana has developed the Omai openpit; Peru has new mines at Yanacocha and Maqui Maqui; in Venezuela La Camorra mine opened in 1994 and a major resource at Las Cristinas has been indentified; Uruguay has opened the Mahoma mine and Argentina may develop the Majo de la Alumbreira deposit.

## China

Gold has been mined in China for over 1,000 years, mainly in Shandong province. A major investment program has lifted official production close to 100 tonnes annually in the 1990s, but local cooperatives and unofficial alluvial mining probably contribute another 30-40 tonnes. All formal mine output is sold to the People's Bank of China, which re-sells some gold for local jewellery manufacturers. International mining companies are providing expertise and anticipate getting into joint venture projects.

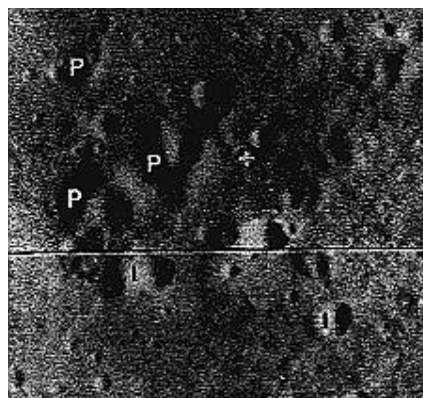
## Ghana

Ghana has been renowned as the gold coast for 2,000 years. In the 1990s its mining industry is undergoing a major revival which has quadrupled output to over 50 tonnes annually. The Ashanti mine, which celebrates its centenary in 1997, contributes much of the output, but there are new joint ventures with foreign mining groups.

## Indonesia and Papua New Guinea

Indonesia and Papua New Guinea, which have many epithermal gold deposits, have become significant producers in the 1990s. The opening of the Misima Island and Porgera mines have pushed Papua New Guinea's output to about 60 tonnes annually. Another large low-grade mine, Lihir Island, is due in the late 1990s. Indonesia is producing annually over 70 tonnes in the mid-90's, ten times more than a decade ago

*Source - The World Gold Council is a non-profit association of gold producers world-wide, with headquarters in Geneva and offices in major markets around the world.*



## THIS MONTH'S CONTEST

You're a recent college graduate hired to carry the bags of famous Planetary Geologist Alice Cramdem on her latest mission to the Moon. As your space craft is coming in for a landing at Lunar Station Marius IV, she indicates two features visible through the window and tells you that they are similiar (i.e. are generally called by the same term), but were formed by different processes. Can you name these features and how they were formed?

Contest prize this month: pencil microscope.

Have your answer ready at the next mothly meeting. You must be present to win. Board members not eligible.

Solution to last month's contest - F8.

Contest winner last month: Ed Rectenwald.

**Call for Papers!**

Bring your ideas for this years publication to the February meeting.



# Calendar

Latin American Energy Conf.  
Miami March 4

International Water Technology  
Conference  
Alexandria, Egypt March 20©23

American Chemical Society  
Annual Meeting  
Dallas March 21©26

Sixth Cambridge Diagenesis  
Conference  
Cambridge, U.K. March 26©27

Geological Soc. of America  
Southeastern Section Mtg.  
Charleston, W.V. March 30©31

Third Middle East Geosciences  
Conference  
Bahrain April 20©22

AAPG Annual Meeting  
Salt Lake May 17©20

GSA Rcky Mtn Sec. Mtg.  
Flagstaff May 25©26

Soc. of Professional  
Well Log Analysts  
Keystone, Co. May 25©28

AWWA Annual Conference and  
Exposition  
Dallas June 21©25

Summit of the Americas '98:  
Energy & Environment  
Miami Beach July 14©17

Georgia Section AWWA Atlanta  
August 16©19

Assessing and Managing  
Health Risk for Drinking  
Water Contamination Santiago, Chile  
Sept. 7©10

Oil & Gas Exploration in  
North America © Mid©Continent  
Symposium  
Wichita, Ks. August 11©13

Georgia Section AWWA  
Atlanta August 16©19

Assessing and Managing  
Health Risk for Drinking  
Water Contamination  
Santiago, Chile Sept. 7©10

Membranes in Drinking and  
Industrial Water Production  
Amsterdam, Neth. Sept. 21©24

Eighth International Williston  
Basin Symposium  
Regina, Kansas Oct. 19©21

GCAGS Annual Convention  
Corpus Christi Oct. 21©23

GSA Annual Mtg.  
Toronto Oct. 26©29

NGWA 50th Anniversary Annual  
Convention  
Las Vegas Dec. 13©16

## EGS MEETING CALENDAR

**1998**

|                    |                    |
|--------------------|--------------------|
| <b>February 17</b> | <b>EGS Meeting</b> |
| <b>March 17</b>    | <b>EGS Meeting</b> |
| <b>March 21</b>    | <b>Field Trip</b>  |
| <b>April 18</b>    | <b>Canoe Trip</b>  |
| <b>April 21</b>    | <b>EGS Meeting</b> |
| <b>May 19</b>      | <b>EGS Meeting</b> |
| <b>June 16</b>     | <b>EGS Meeting</b> |







Join Everglades Geological Society

*Application forms are available:  
at meetings, by mail and on our web site.*

**<http://www.geocities.com/CapeCanaveral/1356>**

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