large-scale production of the light-weight metal magnesium, only 2/3 as heavy as aluminum and ¼ as heavy as iron, from Washington State's magnesite deposits at a cost of possibly less than 8 cents per pound using the cheap Grand Coulee power. The present market price of magnesium metal made from salt brines in Michigan is 28 to 30 cents per pound. With lower prices for magnesium metal free from chloride inclusions it would be used more widely in airplane construction, railway cars, automobile and any sort of equipment that has to be transported as a dead weight.

Science News Letter, February 24, 1940

GEOLOGY

Huge Hole in Cuba Supplies Much of Nation's Manganese

DURING the Spanish-American War one of Teddy Roosevelt's Rough Riders kicked a piece of ore in Cuba and began a chain of events which today sees Cuba supplying a large share of the American steel industry's needs of strategic manganese.

The whole story of the Cuban manganese industry and its role in the economic fortification of the great American steel industry was told at the meeting in New York of the American Institute of Mining and Metallurgical Engineers by F. S. Norcross, Jr., engineer and president of the Cuban Mining Company.

Out of the kick of the Rough Rider's foot have come great holes in Cuba—the largest a half mile long and 1,000 feet wide—which are the strip mine pits where manganese ore is dug out of the earth.

Averaging from 17% to 18% metallic manganese in content, the Cuban ores are refined and concentrated to bring them up to ferromanganese grade for use in steel making which requires 48% manganese or better.

During the years from 1936 through 1938 the steel plants of the U. S. required about 736,000 tons annually of high grade ore from foreign sources. The 1938 Cuban production was 131,000 tons.

Science News Letter, February 24, 1940

MILITARY SCIENCE

Expansion in Naval Research In New Appropriation Bill

THERE is a new deal for research in the Navy and at the top of the pile and coordinating center in the new setup is the Naval Research Laboratory at Anacostia, just outside Washington.

Famed inventor Thomas Edison fathered the electric light, the phonograph and the new Secretary of the Navy, Charles Edison. And the same research spirit which fostered Edison's great inventions appears unwritten between the lines of testimony at committee hearing on the 1941 Naval Appropriations Bill which has just been reported to the House.

A greatly increased staff of scientists, new research equipment and buildings and a recommended budget increase of about $300,000 yearly for research expansions alone, are among the highlights of the report.

Key step in the new research shakeup has been the transfer of the Naval Research Laboratory from the Navy's Bureau of Engineering to the office of the Secretary of the Navy. This makes the research laboratory a peer of the Navy's other bureaus instead of a tolerated offshoot of the nation's nautical family tree.

Cold figures tell the story.

1940 budget for naval research	$370,000
1941 budget requested	$754,130
1941 budget recommended	$653,350
Net gain	over $283,000

Science News Letter, February 24, 1940

ARCHAEOLOGY

Here's One Wartime Saving; No $25,000 Suits of Armor

ONE thing is cheaper in modern war. No king, dictator, or general is inspecting troops in a suit costing $25,000.

A metal outfit which cost a 16th century French king—or his subjects—somewhere around this fabulous sum has been acquired by the Metropolitan Museum of Art in New York. The harness, as armor experts call such a metal suit, is complete from closed helmet to steel shoes, and almost every inch is richly ornamented. Curator of Armor Stephen V. Grancsay suspects that the man who wore it was King Henry II.

The suit cost as much as a military campaign, comments Mr. Grancsay.

Never intended to stand fighting wear, the harness shows America a military dress suit de luxe, of the days when armor was really ornate.

"It was made," says Mr. Grancsay, "to

FIT FOR A KING

Estimated to have cost $25,000, this royal armor shows what a well-dressed 16th century French king wore when he appeared in public after a battle. It is the only complete embossed armor in America. Europe has only five equal to it.

DETAIL

This closeup shows the intricate pattern of the royal embossed armor shown on the facing page.

be worn after the battle to enliven the spectacle of a state entry."

Cost of the outfit is judged from facts known about fees and labor in the medieval armor industry. Three thousand gold crowns was what Philip II of Spain paid to an armorer who made him a similar harness. And Mr. Grancsay figures that both the designer and the artist who embossed and damascened the intricate decorations must have received like sums.

Armor of a strictly business style is having a revival in modern fighting togs, though not to the extent of complete head-to-foot gear. Chief handicap of modern armor, even bullet-proof kinds, is that it is not shock-proof, Mr. Grancsay thinks. If someone could develop a practical shock-proof armor, now, that might be very useful.

Science News Letter, February 24, 1940

●RADIO

Superintendent Paul Gossard, of the Bloomington, Ill., public schools, Prof. John J. Lee, director of special education, Wayne University, Detroit, and Principal Paul L. Essert of the Emily Griffith Opportunity School, Denver, will take part in a discussion of opportunities for exceptional children, interviewed by Belmont Farley, director of publicity, National Education Association, on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, February 29, 4:15 p.m., EST, 3:15 CST, 2:15 MST. 1:15 PST.

Listen in on your local station. Listen in each Thursday.

METALLURGY

West Coast Steel Industry May Come From Discovery

Monopoly of Pittsburgh and Other Eastern Cities May Be Broken by Metallurgical Coke from Wood

A GREAT steel industry for the Pacific northwest sounds fantastic to those who know the present geographical monopoly of Pittsburgh and other eastern and southern steel centers, but inventive genius and engineering skill have combined to bring near a realization of what was once only a dream.

To make steel you need cheap fuel for the blast furnaces, metallurgical coke, limestone and iron ore. Only in limestone could the West Coast meet these requirements if present day standards of steel-making still existed.

As the great hydroelectric projects of the Federal government in the northwest come into being at Bonneville and Grand Coulee, foresighted men have realized that cheap electrical power might make possible electric counterparts of Pittsburgh's blast furnaces. But like the man who, if he had the ham could have ham and eggs, if he had the eggs, cheap electrical power and limestone alone could not produce a West Coast steel industry much as it might be desired from a military, strategic, decentralized standpoint. There was still the need for coke and the need for iron ore.

The iron ore of the west lacks the richness and easy transport facilities by water which make the Lake Superior region dominant in this field. But it is known that 916,000 gross tons of ore were mined and shipped from the west last year with a dollar value of $1,507,000.

This tonnage, however, is only a drop in the bucket for a man-sized steel industry. To supplement the deficiency the visionaries planning a steel industry for the west coast note that over two and a quarter million tons of iron ore were imported in 1939 for the American steel industry. Two-thirds of this vast tonnage came from Chile via the Panama Canal to eastern seaports. For less transportation cost, it was calculated. this iron ore could be taken on up the Pacific to Puget Sound ports.

That figuring, in a sense, supplied the ham for the ham and eggs but it still left the eggs. The non-existent eggs of the old joke is the non-existent metallurgical coke in the West.

What may be the answer to the missing coke for the now non-existent western steel industry has just appeared in a new patent, No. 2,184,317, awarded to Stevan Ruzicka of Beograd, Yugoslavia.

Dr. Ruzicka may not, just now, be a widely known man but his older brother is Prof. Leopold Ruzicka who, last year, won the joint award for the 1939 Nobel Prize in chemistry.

The younger Ruzicka has been in the United States since 1935 perfecting a way to make a sturdy metallurgical coke out of wood. Woodcoke is the only name one can devise for his new discovery but the name, of course, is a combination of paradoxical terms, for real coke comes from the burning of bituminous coal.

What Dr. Ruzicka has done is to find a way to take the waste wood of the Pacific northwest, burn it to charcoal, grind it to a powder and then, by organic binders followed by reheating, he cements it into lumps the size of real metallurgical coke and of comparable structural strength.

He ends up therefore with a woodcoke which has all the desired purities of a charcoal. It is charcoal which has produced the world-famous, high-quality Swedish steels.

However, charcoal of itself is structurally weak and not adaptable to blast furnace operations where the coke is poured into the furnace with a great charge of limestone and iron ore that may weigh hundreds of tons. The new Ruzicka woodcoke, however, possesses the strength needed to adapt charcoal to American blast furnace operations.

The end of the story of the steel industry for the Pacific northwest is in the future, but the final ingredient for a successful industry appears at hand. From the northwest's wasted wood chips —and they are plentiful—can come the strong wood-coke needed.

The advantages of a western industry producing high quality steel would include proximity to the nation's center of the aviation industry and the possibility of a better steel for armor plate.

Science News Letter, February 24, 1940