Rare metals

Unobtainiums

Theyareobscure,yetessential.Whyraremetalsmaketheworldgoround

L

IKE this reviewer, many parents will

havegiventheirchildrenelectrictooth-

brushes for Christmas, hoping that the

sensors that buzz after two minutes will

keep them brushing longer than their

flimsy elbow grease. Both generations

may, however, be ignorant of the fact that

in that time the toothbrushes produce

more than 62,000 strokes; that the power

to generate such motion comes from tiny

magnets using three rare metals, neody-

mium, dysprosium and boron; and that

some ofthese metalsare so coveted that in

2010 theywere atthe centre ofa dangerous

riftbetween China and Japan.

In all, an electrictoothbrush is made of

35 metals. The journey they take to chil-

dren’s gums may involve China, the

DemocraticRepublicofCongo, Chile, Rus-

sia, South Korea, Indonesia, Turkey and

other countries too. They are rare, says

David Abraham in “The Elements ofPow-

er”, a thought-provokingbookthatfollows

the trail of these elements, not because

they are necessarily scarce or hard to ex-

tract. It is because they are used in tiny yet

essential quantities—like yeastin a pizza.

In terms of amounts consumed, these

metals pale compared with base metals

such asaluminium and copper. But, as the

book argues, they are no less transforma-

tive—and possibly just as valuable—as oil

and coal. That is a bold claim, but the au-

thor backs it up convincingly. Using vivid

detail, he injects life and purpose into the

story of elements that are so light, strong,

heat-resistant and elusive that an Ameri-

can general in the 1950s quipped that they

should be called “unobtainium”.

Indium, partofan iPhone’sscreen, is an

“invisible link…between the phone and

yourfinger”. Justa pinch ofniobium, a soft,

granite-grey metal mined mostly in Brazil,

greatlystrengthensa tonne ofsteel used in

bridges and pipelines. Lithium is so light

that it has become essential for recharge-

able car-batteries. Dysprosium, as well as

makingan electrictoothbrush whirr, helps

powerwind turbines. Militarytechnology

depends on numerous rare metals. Tung-

sten, for instance, is crucial for armour-

piercing bullets. America’s forthcoming

F-35 fighter planes are “flying periodic

tables”, MrAbraham writes.

As with oil, those who can secure the

resources have access to immense power.

The problem, the booklaments, isthat Chi-

na, Japan and South Korea are more keenly

aware of the strategic importance of rare

metals than Western countries, including

the United States.

Yet it is not just the rare metals that the

book explores. As Mr Abraham follows

their extraction, he finds geologists, refin-

ers, traders, smugglers and boffins whose

storiesadd to the intrigue ofthisshadowy

trade. Dealsare done in backroomsby like-

able mavericks. One, a New Yorker called

Noah Lehrman, is described as “likely the

only person in history to perform at the

Jewish Grateful DeadFest and advise the

USCongresson resource security”.

“The ElementsofPower” turnsoutto be

a critic as well as an advocate of the rare-

metals trade. One concern is what the au-

thor calls the “long tailpipe” of pollution

leftin the wake ofminingand refining, not-

withstanding the role of minor metals in

creatinggreenerproducts.

Suppliesare also a worry. In 2010 a Chi-

nese trawlerrammed Japanese coastguard

vessels in waters near islands called the

Senkakus in Japanese and the Diaoyu in

Chinese (their ownership is disputed by

both countries). After the Chinese captain

wasdetained, suppliesofrare metals from

the mainland to Japan suspiciously dried

up. Though China neveracknowledged an

exportban, the incidentcaused rare-metal

prices to spike, and unsettled manufactur-

ersaround the world. Though Japan quick-

ly released the captain, repercussions of

the affairpop up through the book.

Mr Abraham would have done well to

use more such central narratives—the

story, perhaps, of dysprosium, which has

one ofthe mostfascinatingand fragile sup-

plychains. Yethe persuasivelyexplains the

dangerofunderestimatinga businessthat,

byone estimate, generates$4 billion ofrev-

enuesa yearand also playsa critical role in

systems worth about $4 trillion. China,

which developsmore rare metalsthan any

other country, understands the calculus.

The West, hisbooksuggests, doesnot.