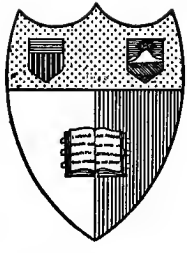
Common Commodities and Industries

GOLD

By White



GOLD

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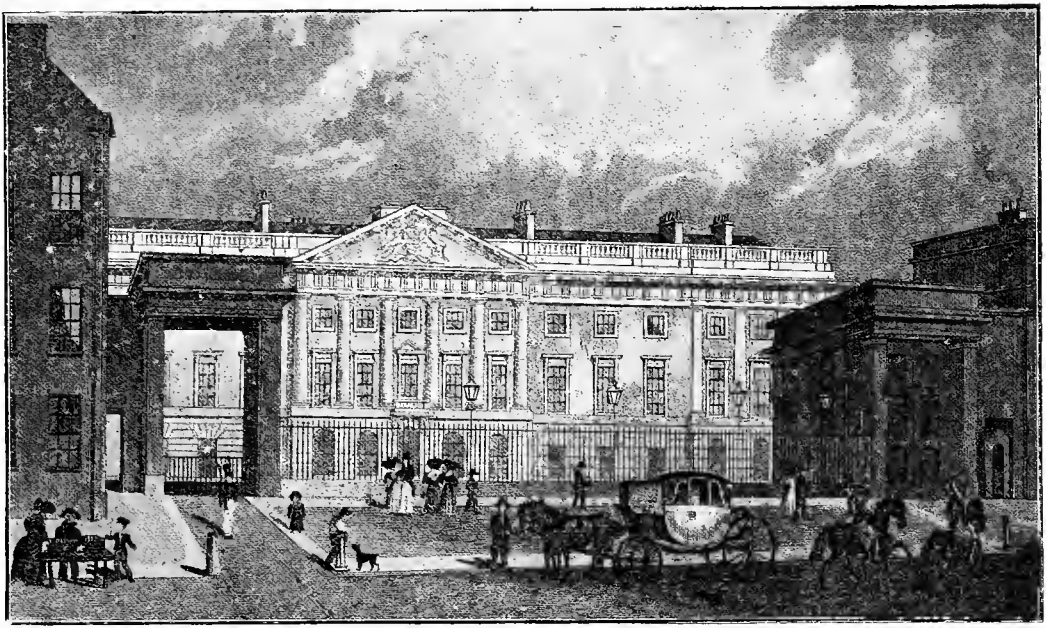

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THE MINT, TOWER HILL, IN 1830

Frontispiece

PITMAN'S COMMON COMMODITIES
AND INDUSTRIES

GOLD

ITS PLACE IN THE ECONOMY OF MANKIND

BY

BENJAMIN WHITE

FELLOW OF THE INSTITUTE OF BANKERS AND OF THE
ROYAL STATISTICAL AND ROYAL
ECONOMIC SOCIETIES

LONDON: SIR ISAAC PITMAN & SONS, LTD.
BATH, MELBOURNE AND NEW YORK

PRINTED BY SIR ISAAC PITMAN
& SONS, LTD., LONDON, BATH,
MELBOURNE AND NEW YORK

PREFACE

In order to write advantageously about any given commodity, it is necessary to consider first in what way the community regards it as a "useful thing." The result of this inquiry naturally decides the lines upon which the treatise should be drawn up.

Take the case of iron, for instance. This valuable metal, owing to the introduction of machinery, and the researches of science in connection with its properties, has assumed so much importance to the economic life of man in the present age, that Kipling conveys an obvious truth when he writes—

> Gold is for the mistress—silver for the maid,
> Copper for the craftsman cunning at his trade.
> "Good," said the Baron, sitting in his hall,
> "But Iron—Cold Iron, is master of them all."

Wherefore any writer, discussing iron as a commodity, must describe the processes by which it is adapted for industrial use, for upon their proper execution, and upon the possibility of their improvement, depends, to a large extent, industrial development and the future prosperity of mankind.

Gold, on the contrary, needs to be considered from quite a different standpoint. Its chief importance does not lie in its chemical and industrial application. It is based mainly upon the *quantity* of its production and the way in which the metal, when produced, is applied to lubricate the wheels of commerce. In other words, in the case of gold, the relation of the metal to Banking and Exchange is of *supreme interest.* The steps by which the metal has acquired its high value, and its past history with regard to production and ancient

use, deserve consideration, rather than the process by which it is separated from the base material with which it is originally associated, for this operation is now so scientifically accurate that very little of the precious metal fails to be recovered.

Further, gold mining as an industry, and its prospects of extension or otherwise, possess particular interest owing to the close connection between gold and prices. Finally, systems of currency, of which gold more or less forms the basis, are an integral part of the subject.

It has not been attempted to delve deeply into details. Authors, far more able and erudite than the writer, have dealt exhaustively with different aspects of these matters. All that the writer has attempted to do is to popularize a subject usually relegated to experts, and to treat it in language as free as possible from technical expressions. The subject may be said to resemble certain scenes, unpromising at a distance, which will repay a closer acquaintance, and it is hoped that the reader will be drawn insensibly to investigate the relation of gold to his daily affairs, and to follow with intelligent interest the references to this metal, which appear constantly in daily and other periodicals.

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GOLD

CHAPTER I

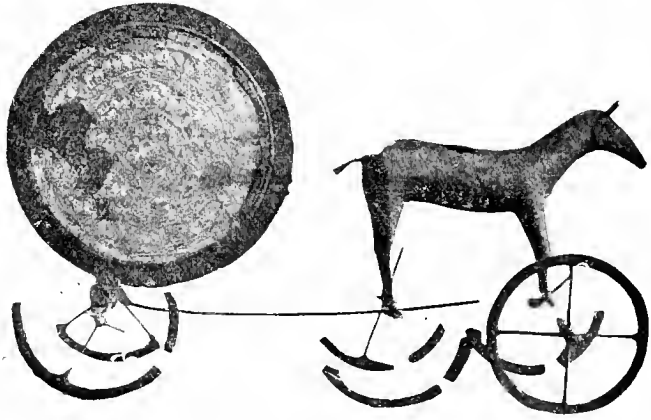
ITS APPRECIATION—ANCIENT AND MODERN

GOLD! what a cluster of memories hovers round the word, and how deeply has it stirred and does still stir the mind of man! Very few are free from some phase or another of its paramount influence as the monarch of metals, and the most widely treasured of all commodities.

The savage, who first admired the golden dust upon the bank of a flowing stream, remarked upon its cheerful gleam, of a ruddy hue not unlike that of the radiant sun to whom he paid daily reverence as the source of his joys, and the arbiter of his simple calendar. It requires no great stretch of imagination to picture him gathering the golden grains, and pouring them as a votive offering, an emblem of his gratitude to the golden orb, which represented to his untutored mind the Giver of all Good.

So has it ever been! Gold has been associated with the Sanctuary, and with the Palace of Royalty, whose prerogative has been considered to emanate from Divinity itself. Emperors and kings in far-off days, millennia before the Christian era, not only assumed their functions as *deputies* of the gods, they also claimed divine origin, and, in not a few instances, insisted upon divine honours being rendered by their subjects. The ancient scarcity of gold, and its majestic brilliance when fashioned into an ornament, linked the metal, in peculiarly close fashion, with priest and king.

It is not without significance, that it is the first commodity definitely mentioned in the Bible after the institution of the Garden of Eden. "And a river went out of Eden to water the garden: and from thence it was parted, and became into four heads: the name of the first is Pison: that is it which compasseth the whole land of Havilah, where there is GOLD." (*Gen.* ii. 10-11.)



ANCIENT GOLD OFFERING TO THE SUN GOD

The Psalmist could consider no finer phrase by which to suggest Royalty, than to describe, as adorned with a circlet of this metal, the Prince of God's own choosing. "For Thou preventest him with the blessings of goodness: Thou settest a crown of pure GOLD on his head." (*Ps.* xxi. 3.) Nor could the writer of the Apocalypse devise more splendid imagery for the glories of the Heavenly City than to state "the street of the city was pure GOLD, as it were transparent glass." (*Rev.* xxi. 21.) It is remarkable that the first of these

quotations comes from the Second Chapter from the beginning of the Bible, and the last from the Second Chapter from the end.

The sacred record abounds with references to gold; no less than six different words are employed for it in the Old Testament alone. This is not surprising, for the chequered history of the Hebrew race has been continuously associated with the precious metals, particularly with gold. The following details are taken from the *Oxford Cyclopedic Concordance*—

1. (1*st Kn.* ix. 28.) Heb.: *Zâhâb.* Greek: Χρυσίον The commonest name, from its colour.
2. (*Job* xxviii. 17.) Beb.: *Pâz.* Greek: Χρυσίον R.V. "fine gold." The native metal.
3. (*Job* xxii. 24.) Heb.: *Bétzer.* Greek: πέτρα Σωφίρ Gold dust, fragments of ore.
4. (*Ps.* lxviii. 13.) Heb.: *Hârûtz.* Greek: Χρυσίον R.V. "yellow gold." Referring to its lustre.
5. (*Job* xxviii. 15.) Heb.: *Sâgûr.* Greek: περιουσιασμός Treasure.
6. (*Job* xxviii. 19.) Heb.: *Kéthem.* Greek: Χρυσίον καθαρόν R.V. "pure gold." *Kéthem*—concealed gold, denoting its high value.

And woman! Always has she been an easy victim to its charms! Gold, less subject to corrosion than silver, delightful to handle, easy to model into pleasing forms, agreeably harmonizing with dress and complexion alike, ensnared her heart, and always will. To her gold has memories! Many a woman has bartered home, happiness, health, and honour in exchange for golden treasure, and bitterly has rued the day.

The so-called weaker sex, however, has been less a victim to the fatal charm of gold than man himself, for to him, gold spells POWER. Gold *unlocks* things! Few are the doors unresponsive to a golden key. Not

thrones alone, but authority and control, open and concealed, are to be acquired by its subtle influence.

Still darker memories are associated with gold, for the very getting of it has been associated with curses and foul deeds. Hapless thousands have been put to the sword in order to seize mining districts, or, as in the sixteenth century Mexico, have spent their lives toiling in mines as slaves in order to enrich their taskmasters.

The metallurgist, as he thinks of gold, recalls the futile quest of the alchemists of old, who sought to transmute the base into the precious. Truly a false ambition, which Hawthorn has covered with dainty ridicule in his *Tanglewood Tales*. King Midas is shown applying the magic touch for the transformation of common articles of daily use, as well as the lovely denizens of the garden, into golden objects, beautiful to look upon, but, in the latter case, robbed of natural charm. No lesson as to the true value of gold has been drawn more delicately than when the soul's delight of King Midas, his loved young daughter, turned into a golden statue at the caress of her distracted father.

The thoughts of the miser linger around gold. Hoarding possesses peculiar fascinations for certain minds. They seem to have the Magpie faculty, and the habit grows with passing years to an overmastering intensity. A human relic disinterred at Pompeii still clasped a bag of treasure in his shrivelled hand. Such overwhelming affection for gold often has been displayed regardless of risk to the life here or that beyond the grave.

The ancients held emphatic views as to the value of gold, as may be gathered from their sayings which have been handed down. They are of a widely diverse character, as might be expected, for some sing the praises of the metal, and others just as positively

the very opposite. Agricola, the learned metallurgist, who lived in the middle of the sixteenth century, gathered together some of these utterances in his celebrated treatise *de Re Metallica*, of which a reproduction, translated from the Latin by Mr. Herbert Clarke Hoover and Mr. Henry Hoover, was published in 1912. Thus Agricola quotes from Euripides: "Plutus is the god for wise men; all else is a mere folly, and at the same time a description in words"; from Theognis: "O Plutus, thou most beautiful and placid god! whilst I have thee, however bad I am, I can be regarded as good"; from Aristodemus the Spartan: "Money makes the man, no one who is poor is either good or honoured" (this a striking contrast with the English proverb, "Manners makyth the man"); from Timocles: "Money is the life and soul of mortal men. He who has not heaped up riches for himself, wanders like a dead man amongst the living"; and from Meander: "Epicharnius asserts that the gods are Water, Wind, Fire, Earth, Sun, and Stars. But I am of opinion that the gods of any use to us are silver and gold! for if thou wilt set these up in thy house, thou mayest seek whatever thou wilt. All things will fall to thy lot: land, houses, slaves, silver work; moreover friends, judges, and witnesses. Only, live freely, for thus thou hast the gods to serve thee."

The ancient writers seem to have been much impressed with the purchasing properties of gold. Propertius declared, "this is indeed the golden age. The greatest rewards come from gold: by gold love is won, by gold faith is destroyed, by gold justice is bought; the law follows the track of gold while modesty will soon follow it, when law is gone"; and Diphilus asserts: "I consider nothing is more powerful than gold. By it all things are torn asunder, all things are

accomplished." Naturally the satires of Juvenal refer to the precious metal in unflattering terms. "Demoralising money first introduced foreign customs, and voluptuous wealth weakened our race with disgraceful luxury."

LYDIAN GOLD COIN (ABOUT 568–554 B.C.).

PERSIAN GOLD DARIC (521–485 B.C.).

Agricola rubs home the temptations which gold presents by means of classic instances in the following words—

For example, Polymnestor, King of Thrace, to obtain possession of his gold, killed Polydorus, his noble

COIN OF TYRE (ABOUT 400 B.C.).

guest and the son of Priam his father-in-law, and old friend. Pygmalion, the King of Tyre, in order that he might seize treasures of gold and silver, killed his sister's husband, a priest, taking no account of either kinship or religion. For love of gold Eriphyle betrayed her

husband Amphiaraus to his enemy. Likewise Lasthenes betrayed the city of Olynthus to Philip of Macedon. The daughter of Spurius Tarpeius, having been bribed with gold, admitted the Sabines into the citadel of Rome. Claudius Cnrio sold his country for gold to Caesar, the dictator. Gold, too, was the cause of the downfall of Aesculapius, the great physician, who it was believed was the son of Apollo. Similarly, Marcus Crassus, through his eager desire for the gold of the Parthians, was completely overcome together with his son and eleven legions, and became the jest of his enemies, for they poured liquid gold into the gaping

GOLD STATER OR PHILIPPUS OF PHILIP II OF MACEDON[1]

mouth of the slain Crassus, saying: ' Thou hast thirsted for gold, therefore drink gold.' "

Agricola sums up the following passage, the contempt in which philosophers and others of old held the precious metal—

" And it is said that Socrates having received twenty minae sent to him by Aristippus, a grateful disciple, refused them and sent them back to him by the command of his conscience. Aristippus, following his example in this matter, despised gold and regarded it as of no value. And once when he was making a journey with his slaves, and they, laden with the gold, went too slowly, he ordered them to keep only as much of it as

they could carry without distress and to throw away the remainder. Moreover, Anacreon of Teos, an ancient and noble poet, because he had been troubled about them for two nights, returned five talents which had been given him by Polycrates, saying that they were not worth the anxiety which he had gone through on their account. In like manner celebrated and exceedingly powerful princes have imitated the philosophers in their scorn and contempt for gold and silver. There was for example, Phocion, the Athenian, who was appointed general of the army so many times, and who, when a large sum of gold was sent to him (as a gift by Alexander, King of Macedon), deemed it trifling and scorned it. And Marcus Curius ordered the gold to be carried back to the Samnites, as did also Fabricius Lucinus with regard to the silver and copper. And certain republics have forbidden their citizens the use and employment of gold and silver by law and ordinance; the Lacedaemonians, by the decrees and ordinances of Lycurgus, used diligently to inquire among their citizens whether they possessed any of these things or not, and the possessor, when he was caught, was punished according to law and justice. The inhabitants of a town on the Tigris, called Babytace, buried their gold in the ground so that no one should use it. The Scythians condemned the use of gold and silver so that they might not become avaricious."

Agricola labours to prove that the evils connected with gold to which he has alluded, owe their origin not to the metal itself, but to the unbridled lust in the heart of man, and demurs to the saying of Tibullus: "This is the fault of the rich man's gold: there were no wars when beech goblets were used at banquets." But he seems to overlook the crucial point, that it is the inherent qualities of gold, which associate gold

with crime, namely, the scarcity of the metal, and its handiness for the purpose of conveyance or concealment, as well. as its tempting beauty. These qualities confer upon gold an attractiveness such as no other commodity enjoys, and therefore, to the very metal itself can be attributed more temptation to crime than attaches to any other article of commerce.

It may be taken for granted, from the records of antiquity, that gold possessed a distinct value in prehistoric times, measurable by other commodities, and

Calendar Year.	*United States Coin.*	*Domestic and foreign Bullion and foreign Coins.*	*Total.*	*Old Material.*	*Grand Total.*
1907	3,500,000	27,967,816	31,467,816	9,259,254	40,727,070
1908	3,500,000	20,945,797	24,445,797	7,030,294	31,476,091
1909	3,500,000	26,748,209	30,248,209	7,380,560	37,628,769
1910	3,500,000	30,660,874	34,160,874	7,626,278	41,787,152
1911	3,500,000	29,603,054	33,103,054	7,731,238	40,834,292
1912	3,500,000	32,370,552	35,870,552	8,106,705	43,977,257
1913	3,500,000	34,001,831	37,501,831	8,362,235	45,864,066
1914	3,500,000	33,912,758	37,412,758	8,107,274	45,520,032
1915	3,500,000	26,099,507	29,599,507	8,220,520	37,820,037
1916	3,500,000	37,620,149	41,120,149	9,941,038	51,061,187

that this appreciation was maintained owing to the travel of the metal far from the place of origin, and to the purpose to which it was almost universally applied, namely, the adornment of the person. So precious has the metal been ever held, that it has been remelted and refashioned again and again, with the result that a certain quantity, retrieved from the soil in uncounted ages past, must still form part of the present world's stock, although its identity has been entirely merged in the fresh material since produced.

The United States Mint takes special pains to differentiate between new and the old material sent into

the assay offices under its control. The Director gives the amount of gold furnished for use in manufactures and in the arts. He states that the classification of the several descriptions of material used during the ten calendar years ending 1916 was as shown on page 9.

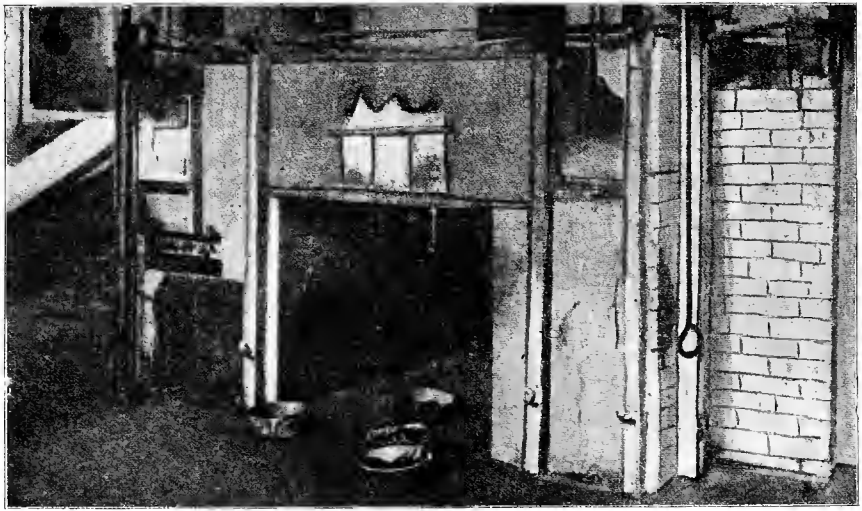
Thus, during the decade 1907-1916, a grand total of gold, valued at about £85,000,000 was devoted to the arts and sciences in the United States of America alone.

CHAPTER II

ITS PROPERTIES AND DISTRIBUTION

GOLD is accounted an element. It derived its ancient value mainly from the permanency of its colour and lustre. The former varies, although no other material may have been added. For instance, when precipitated, it becomes ruby red and, when reduced into thin leaves, there is observable a greenish tinge. An admixture of copper deepens, and one of silver subdues its natural tint. The specific gravity of gold varies considerably according to the condition in which it exists. Cast gold varies from 18·29 to 19·37, and can be raised still higher by means of pressure. The melting point lies between 1061·7 and 1067·4° C. Amongst its valuable properties are its non-liability to tarnish at any temperature and its malleability and ductility. As to the second quality, it stands foremost among metals. It is softer than silver, and can be welded with ease when cold, and it is so ductile that it can be cut quite easily with a knife. If a powerful current of electricity be passed through fine gold wire or leaf, the metal is dissipated. Gold cannot be dissolved by any " single " acid except selenic, but in nitro-hydrochloric acid and also in free chlorine it dissolves readily.

A peculiar faculty of gold is thus described in the *Metallurgy of Gold.* (Rose, p. 15, 3rd Edition, 1898): " If gold is placed at the base of a cylinder of lead 70 millimetres high, some is found to have reached the top in thirty days; temperature of whole at 251° C. The rate of diffusion is still measurable at 100° C, but almost inappreciable at ordinary temperatures."



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CUPELLATION FURNACE

For the manufacture and use in the Arts, various alloys have been and are still employed. Electrum, the material of which the earliest coins were formed, a compound of gold and silver, is considered by some to have been a natural alloy. The following qualities are made up in England for ordinary use as jewellery: 375, 625, 750, and 916·6 parts in the 1000 fine. In France, the qualities are 920, 840 and 750 respectively. Goldsmiths make use of a greenish alloy, comprised of 30 per cent. gold, and 70 per cent. silver. A preparation styled "blue gold" is comprised of 75 per cent. gold and 25 per cent. iron. The black material frequently applied by the Japanese to ornament sword furniture, is an alloy of gold, containing 30 per cent. of that metal, and 70 per cent. copper. Amongst other metals with which gold is alloyed may be mentioned zinc, tin, palladium, platinum, rhodium, iridium, nickel, and cobalt.

Gold is usually found in a native state as grains or scales amongst sand, where water is, or has been, present. Frequently precious stones may be found in its company, such as rubies, topazes, and garnets. Nuggets are discovered in quartz veins, and occasionally the metal is found in spikelets. Specimens of quartz from Queensland can be seen, from which delicate polished threads of gold emerge at several different angles.

Rocks of various geological epochs contain gold, but mostly those which have been metamorphosed, and are rich in quartz. Pyrites are often mistaken for gold by the uninitiated, but a ready test can be made by attempting to cut the metal with a knife, an act easily accomplished if the metal be gold. If the pyrite be copper, it will crumble at the impact, if it be iron the knife will make no impression whatever.

Sometimes gold is present in sedimentary rocks, in layers of such minute thinness that they look as if they had been laid on with a paint brush. In far distant aeons, a stream must have washed golden dust, imperceptibly small, across the sandy bank, which ultimately hardened and held it fast.

Ireland was an early and very prolific source of gold production, and here objects formed of this metal have been unearthed, dating back to the Bronze Age. Gold is still found in Wales (in 1918 fresh discoveries were reported), and in a few other spots in the British Isles, as well as some in Ireland. In Europe, gold is found in Hungary, Transylvania, Piedmont, Spain and Russia. In Asia, it exists in Siberia, Thibet, China, Japan, Sumatra, Java, and Borneo. In Africa, gold mining takes place in the Transvaal, Rhodesia, Natal, Cape Colony, West Coast, and Abyssinia. In the Americas, from the Arctic to the South Pacific Oceans, gold is found at intervals. Alaska, the Yukon, the Rocky Mountains, many of the Federated States that comprise the United States of America, Mexico, Chile, Bolivia, Peru, Brazil, and other independent States each contribute a quota. Whilst away in the far Pacific, Australia, New Zealand, Tasmania, and other islands swell the total of the world's production.

Thus, world wide as is the demand for this precious metal, world wide also are the means of replenishing the stock. Indeed, an almost inexhaustible store of gold could be obtained from the seas that encompass the globe, were it possible to devise an inexpensive method of extracting the minute proporton with which it is impregnated. The writer has handled a shining bead of pure gold derived at great cost from the seas that wash the shores of this country.

The universal demand for this metal is so great,

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that special pains are always taken to gather up the fragments that remain after articles have been manufactured or ornamented by hand or machinery, and a considerable trade is done in such refuse which goes by the name of "Sweeps." An engraver, for instance, has his benches and workshops carefully swept at the conclusion of each day's work. It used to be customary for the annual sale of the sweep to be the pin money of the engraver's wife, and a valuable perquisite did it frequently prove. It is possible, however, that this custom of gallantry, like that of valentines, has fallen into disuse in the present utilitarian age.

When the Wood Street Smelting Works, an institution the antiquity of which dated back a couple of centuries ceased to exist in 1904, a firm contracted for the right to remove and dispose of the floors and the soil beneath. From this waste material precious metal worth some thousands of pounds sterling was recovered, mostly in the form of fine dust and minute fragments, which had percolated through the boards in the weighing rooms, or through chinks in the furnace floor, during the long series of years that gold and silver had been handled in the buildings.

Included in the "Sweeps," the metallic contents of which are separated by the purchasers, are residues from washings, pickles, colouring solutions, as well as sweepings from floors, walls and benches. The sweep is taken to the smelting furnaces, and charged with a quantity of lead which assimilates the precious metals. The residuent lead is subjected, when in a molten condition, to a blast of air directed upon the surface. Contact with the oxygen in the blast converts the base metal into oxides, which are removed as formed, until a mixture is left upon the bed of the "test," consisting practically of pure gold, silver, platinum,

and iridium. This material is poured into water, and is thus converted into grains. The grains are treated with sulphuric acid, which carries off the silver in solution. The pure metal is then precipitated in the form of a greyish white sand, with the aid of copper sheets. The metal, unaffected by the application of the sulphuric acid, is treated with aqua regia, by means of which a solution of gold and platinum is obtained, and, from this, pure gold, like brown sand in appearance, is precipitated by means of iron salt. The residue, consisting of platinum, iridium, etc., is treated by further processes until the constituent elements are recovered separately. So much for the care bestowed in recovering infinitesimal particles of precious metal, which otherwise would be wasted.

The value of gold is relative not absolute. It consists in the fact that it represents stored labour, but, when an immediate exchange is required for it, its value as expressed in commodities, varies to an extreme degree. Inasmuch as gold is used as a basis for the prices of other commodities, a general rise or fall of such prices really indicates the value of gold. Sometimes a specific fall may take place. For instance, just after the battle of Tamai, in the Soudan, gold suffered great depreciation owing to the demand for and scarcity of liquid refreshment. Half a golden sovereign was asked and received by enterprising Greek sutlers, for a bottle of beer.

Readers of Jules Verne, that charming and wonderfully foreseeing novelist, will recall in his account of a romantic journey across Africa in a balloon, how the escape of the gas rendered it necessary to jettison the magnificent specimens of gold quartz, which had been accumulated by the voyagers. On this occasion,

the value of gold was as nothing compared with a few cubic feet of hydrogen.

Disasters have not infrequently attended venturesome expeditions into the unknown and inhospitable regions of the Arctic and Antarctic Circle. When the stores were exhausted, and fuel proved insufficient to sustain vital warmth, how mocking and utterly unsatisfying must the possession of a golden coin have appeared to the helpless possessor.

Nor do these considerations apply alone to the extreme instances to which allusion has been made. Health, a sufficiency of the necessaries of life, the joys of the home circle, and a contented mind together with simple pleasures available more or less to all, such as sunlight, the beauties of nature, and the charms of music, are treasures, beside which the mere possession of gold is quite insignificant.

The preceding remarks may savour of the moralist, but even the financial economist is gradually coming to the conclusion that an accumulation of gold, even for the definite purpose of forming a so-called reserve, is not a *sine quâ non*. Reserves held in gold are *not alive*, but in a state of *suspended animation*. Gold reserves may be necessary in the present structure of currency systems, but as the world moves towards an accurate solution of such problems they are likely to be superseded to a much greater degree, if not entirely, by living reserves of a more profitable character.

The need for some alteration of present methods is indicated plainly by the following occurrence. On one occasion, £100,000 in golden coin, was forwarded from London to a Continental bank. A couple of years afterwards, the twenty boxes were returned, unopened, with the original seals intact. Little comment is needed to show that, as absolute confidence was indicated in

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PORTION OF ASSAY DEPARTMENT

the good faith of the senders by the fact that the boxes had not been opened, a written promise to pay carrying interest upon the amount of the debt would have served equally as well with regard to safety, and some 7 or 8 per cent. better as to profit.

Bankers have their memories of gold, and, let it be said at once, the light in which they regard the metal is the most reasonable of all. It is a mere accumulation of matter, capable of sub-division into the most minute quantities, and it possesses, as a commodity, a value relative to the other commodities, so stable that it performs the function of a medium of exchange more perfectly than any other. It also possesses a faculty, which, to a banker's mind, is of extreme importance, namely, it retains this stability for an extended period.

It is almost impossible for a lay mind to understand the perfect indifference with which the banker handles and thinks of the metal itself. It is a mere means to an end. Its attractiveness consists, not in the appearance of the mere mass of cumbrous metal stored in his strong room in the form of coins or bars, but in the fact that it is the basis for extremely satisfactory figures, recorded in his ledgers. The following chapters will touch upon many details, but the reader will find that the prevailing idea as to gold in the mind of the writer (whose experience for thirty-five years has been derived from Foreign Banking) is that it represents the base upon which, the world's financial structure is reared.

CHAPTER III

PRODUCTION IN EARLY TIMES

It is quite possible that gold was the first metal worked in Europe, and that it was made use of as far back as the Stone Age. The earliest mention of this metal was made in the code of Menes, fragments of which have descended to us. This particular code was of Egyptian origin, but the Hindoos possess a code of Manu; the Thibetans revered the name of Mani; the Lydians, Manes; the Phrygians, Manis; and the Cretans, Minos. All these nations were of Aryan stock, and it is quite possible that the teaching of the sage they honoured, may have been transmitted to Egypt under the name of Menes, and may have thus attained subsequent publicity.

The code contains a reference to the ratio between gold and silver. This is of significance, for indications of the existence of gold deposits in Egypt proper are very slight, whilst, for thousands of years, mines have been worked in India. As a constant flow of silver has been maintained from the West (Spain, Greece, etc.), where it used to be found, to the East (India, China, etc.), where none, or hardly any was produced, it is but natural that the ratio of exchange between the two precious metals should have become a matter of legislation in India. Nevertheless, some authorities do not favour India as the source, for Wilkinson considers the probable date of the Menes code as 2950 B.C., and Colbrook attributes the Hindoo Manu code to the 12th or 14th century B.C., some 1,500 years later.

We shall not, however, be very far wrong when we

assume that the first recorded reference to gold was about twenty centuries B.C., and that it emanated from the East. This assumption is confirmed by the statement of Pliny: "The Dardaneans inhabit a country, the richest of all India in gold mines, and the Selians have the most abundant mines of silver. In the country of the Naraens, on the other side of the Mountain Capitalia, there is a very great number of mines, both of

PAINT GOLD

The gold washed on the surface as if by a brush

gold and silver, in which the Indians work very extensively. Just within the mouth of the river Indus there are two islands named Chryse and Argyre, so called, as I think, from the mines of gold and silver which are found there: for I cannot believe, what some have asserted, that the soil on them consists wholly of those metals."

No definite date can be set to the exact period to which

these remarks obviously refer. That it was considered as ancient is plain, and there is strong evidence from other quarters that an important source of supply in early times, probably the most important, was the gold dust carried down stream by the rivers of the Deccan, of Orissa, and of Berar, as well as that recovered from the sands of the streams which issue from the foot of the Himalaya mountain range.

It should be remembered that scientific mining was unknown in those days, and that the greater part of the supply of precious metals was derived from the surface of the soil and in an almost pure state: gold was found in the form of gold dust, and in that of spicules or leaf-like pieces of metal.

The desire to acquire gold has been a potent cause of exploration. To-day, a traveller finds by experience that it is also a most effective way to get rid of it. The Phoenicians, those astute and adventurous spirits of the ancient world, linked up their history with gold. Cadmus, whose career dates back to the fifteenth or sixteenth century before Christ, is renowned for opening a gold mine in Thrace, and for the invention of the alphabet. Another Phoenician, Jason, two or three centuries later, commanded and organized a filibustering expedition in a fifty-oared galley, the object of which was probably to despoil Sardinia of the gold, which was to be found at that time there deposited. The same ubiquitous race of adventurers, about twelve centuries before Christ, worked the gold placers at Tartessus, the modern Guadalquiver in Spain—supposed to be the Tarshish of the Bible.

About the same period, the Phrygians washed from the sands of the Pactolus—near modern Smyrna—their golden contents. These rich deposits were held to be the source from which Croesus, Midas, and Pytheus

derived their fabled wealth. The last mentioned is stated to have had treasure estimated in modern currency at close upon the value of two millions sterling. Considering the difference in the purchasing power of money between then and now, the sum is astounding. The treasures of Tartessus and Pactolus seem both to have been exhausted at about the same date, 500 B.C.

Darius of Persia (500 B.C.) and two centuries later Alexander the Great made violent and successful efforts forcibly to corner the world's supplies of precious metal. The abundance of coin bearing the head of the latter is evidence more reliable than the statements of ancient historians—often more romance than sober fact—how successful his effort proved to have been. It is believed that, in addition to the alluvial supplies to which reference has been made, gold used to be obtained from ancient quartz mines in Siberia, Egypt, and Greece.

Concerning the last, Theophrastus wrote in 240 B.C.: "Those who dig in the mines cannot stand upright at their work, but are obliged to lie down, either on their back or on their side: for the vein of earth they dig runs lengthwise, and is only of the depth of two feet, though considerably more in breadth, and it is enclosed on every side with hard rock, from which the ore is obtained."

The accounts of ancient historians attach considerable importance to Spanish mining. Pliny states: "Some have related that Asturias, Galicia, and Lusitania, furnish 2,000 lbs. (21,800 oz. troy) of gold annually, but Asturias supplies the most: nor in any other part of the world, during so many ages has so great a quantity been obtained. In every species of gold there is a proportion of silver: in some, a tenth part, in others a ninth, and in others an eighth. In one kind of gold

alone, called Albicavense, there is only a thirty-sixth part of silver, on which account it is valued more than any other." The mines passed under Carthaginian control, but the actual work was performed by natives, who were reduced by their taskmasters to a condition of slavery. The fact that the prosperity of Carthage was buoyed up by such artificial aid infected it with an element of decay. In a striking sentence, Heerens, in his work upon the early nations, sums up the great contest between the great rival powers of that period: " Rome trusted to itself and its sword, Carthage to its gold and its mercenaries. The greatness of Rome was founded upon a rock: that of Carthage upon sand and gold dust."

Ireland possessed a considerable quantity of gold before and during the existence of the Roman Empire, as shown by the variety of ancient golden objects buried beneath its soil, and it is very probable that most of the gold of which they are formed was obtained within the island itself.

Thus far, the earliest sources of gold supplies have been touched upon. From the fifth century A.D., onward, the yield from European sources appears to have been slight, doubtless owing to the break up of the peace ensured by Roman supremacy. It is considered probable that though mining generally may have lapsed, the sands of the Iberian rivers and of the Rhine were washed continuously for their golden deposits. But, for many centuries, the precious metals seem to have been obtained by force and looting from their unhappy owners, rather than by the peaceable art of mining.

During the Middle Ages the river Tagus in Portugal continued to furnish gold—as it had done under the auspices of the Phoenicians, some thousand years before

Christ. The Arabs worked the mines for a while, until they were dispossessed by the Portuguese in A.D. 1147 Between this year and A.D. 1550, it is estimated that £378,000 was thus obtained. The rivers Guadalquiver, Darro, Douro, and Rhine also contributed their quota. Gold was obtained from mines in Hungary and its neighbourhood, namely, at Kremnitz, Magybarya, Abrudbarya, the Farebajer Mountains, Salzburg, and Altenburg. A small quantity was also derived from Alpine districts. On the whole, the unrest which obtained in the Middle Ages—the almost constant warfare and spoliation which was waged—presented serious obstacles to the mining industry generally. It should, however, be borne in mind that gold was being produced in India almost continuously and possibly in Japan also, and that a quantity was accumulating in these countries, which probably became available for Western nations, when close commercial intercourse took place with them at a subsequent date. Indeed, Baron von Humboldt, stated in his *Fluctuations of Gold,* that: "America was discovered not as has been so long falsely pretended because Columbus predicted another continent, but because he sought by the West a nearer way to the gold mines of Japan and the spice countries in the South-east of Asia."

The voyages of Columbus had remarkable results for the kingdom of Spain—which furnished his equipment and resources—as well as for the world at large. The discovery of the vast wealth of precious metals in the soil of Mexico and South America, created for Spain a great Colonial Empire, and endowed her princes and people with immense material wealth. It also redounded to the prosperity of the Papacy, which afforded Spain a sort of legality for the exploitation of the helpless American peoples, by authorizing the expeditions to

be accompanied by priests, commissioned to proselytize them in the name of religion. Columbus did not hesitate to mask his cruel actions with a semblance of piety, and even to ascribe a religious value to gold itself on the grounds that "whoever possesses it obtains what he will in this world, nay even by the payment of masses brings many souls into paradise." (*Humboldt.*)

The first footing obtained in the New World was at Hispaniola (in the year 1492), where some gold ornaments were observed; this led the visitors to expect abundance of the metal. Such was the terror inspired by unsuccessful attempts on the part of the Spaniards to extract treasure that had no existence, that the following story is related touching a cacique of a province of Aiba, named Hatney. "Apprehensive that the Spaniards would come, as they afterwards did, to his territory, Hatney called his people together, and recounting the cruelties of the white man, said they did all these things for a great Lord whom they loved much. The Lord he would show them. Accordingly, he produced a small basket filled with gold 'Here is the Lord whom they serve and after whom they go: and, as you have heard, already they are longing to pass over to this place not pretending more than to seek this Lord: wherefore, let us make to him here a festival and dances, so that when they come he may tell them to do us no harm.' The Indians approved this counsel, and in order to propitiate the god, whom they thought their enemies worshipped, they danced around it until they were quite exhausted. Whereupon the cacique turned to them and said that they ought not to keep the God of the Christians anywhere, for, were it even in their entrails, it would be torn out, but that they should throw it into the river, so that the Christians

might not know where it was, and there (says the account), they threw it."

During the seventeen years following the discovery of Hispaniola, an amount of gold, valued at only about a million pounds, was obtained, but the cost was thousands of Spanish lives, many expensive expeditions, and the destruction of at least a million and a half of Indians.

Another scene of search for gold was the Isthmus of Darien, discovered by Columbus in 1502. The results were very poor—up to 1512, only 15,000 pesos worth had been secured—but, as in Hispaniola, the cost in human life was terrible. It was the practice to take advantage of the confiding nature of the Indian, and then to destroy him. A scoundrel named Juan de Ayora, after being fêted by a cacique, ordered him to produce gold or be burnt or thrown to bloodhounds. Although the few trinkets possessed by the tribe were gathered together and handed over to Juan de Ayora, he ordered his wretched host to be burnt alive in the presence of his terrified subjects. A chance hint thrown out in disgust by a cacique's son, that he could show the Spaniards a land six suns journey to the South, where they could get bellies full of it, led to the discovery of the wonderful golden treasures of Peru.

The chief villain of the piece in Darien, Vasco Nunez, also tried his hand in Panama, which he hoped to make a base for a foray into Peru, but intrigues at home caused him to be put to death.

Panama, from the gold hunters' point of view, was another failure. Espinosa's operations were of so disgraceful a character that they were exposed by one of his party, a Franciscan monk, who returned disgusted to Spain. He alleged that he himself had actually seen at least forty thousand unfortunate natives murdered

in cold blood, or thrown to ferocious dogs. The net proceeds of the expedition were only 80,000 pesos of gold—blood money at the rate of two pesos a head!

An important and more successful raid into American territory was that of Cortes in 1518, when his expedition was the first to enter Mexico. The circumstances were so picturesque, that they have touched the imagination of historians, who have invested the affair—really of a brutal and sordid character—with an abundance of graphic detail. Cortes hazarded his all at the outset of the affair, for he burnt his boats, and launched himself, with only about 450 European followers—armed cap-a-pie—mid a populous, and somewhat martial nation, already in possession of a civilization of its own.

Montezuma, the Aztec Emperor, received him with friendly warmth, but exhibited, in woeful innocence, a profusion of wealth in precious metal. This sealed his doom and that of his country. By methods, either of craft or force, Mexico, the ancient capital, was seized with the aid of native allies, after a siege of seventy-five days. This event was preceded by the surrender of 100,000 ducats of gold, tendered by Montezuma in a vain attempt to placate the insatiate invaders. It is said that when Montezuma acknowledged the possession of gold, Cortes replied: "Let him send it to me, for I and my companions have a complaint, a disease of the heart, for which gold is a sovereign cure."

The expedition of Cortes, however did not prove so momentous in its results, either as to the acquisition of gold, or as to the foundation of the Spanish American Empire, as that of Pizarro, another bold adventurer, who was financed and equipped by Pedrarias, the father-in-law of Vasco Nunez.

Delmar, thus records the temptations that met the eyes of the explorers on their arrival at the coast.

"At a small island which they had passed the day before, the Spaniards had found and pillaged a native temple, containing a stone image and rich offerings of gold and silver pieces, wrought into the shape of hands, women's breasts and heads, a large silver jug, which held an arroba (four gallons of water), etc. At Tumbez, where they were received with wonderment and hospitality (the place was too strong to attack), they beheld a fortress with six or seven walls, aqueducts, houses of stone, and vessels of silver and gold. Being invited into the temple and palace (for Tumbez was a watering place where the Inca, Huayna-Capac occasionally dwelt), they perceived that the former was lined with plates of gold, the latter filled with gold and silver vessels, furniture, etc., and the gardens ornamented with golden statues." This wondrous news was carried back to Panama, and an opportunity of more intimate acquaintance with this land of gold and silver riches was eagerly sought.

Taking advantage of a quarrel between the sons of Huayna-Capac, the newly deceased Inca, Pizarro took the side of Atahualpa, and invaded Peru, with the demand that the latter should come and meet him. Atahualpa came, attended by 5,000 unarmed followers, wearing, unfortunately for themselves and their country, armour and crowns adorned with gold. Pizarro promptly picked a quarrel, took the Prince a prisoner and plundered his camp.

Atahualpa, enlightened by this time as to the chief aim of the strangers, offered to find a ransom in gold sufficient to fill his prison cell as high as he could reach, if he were allowed two months in which to collect it. Needless to say, this handsome offer was accepted forthwith. The ransom, consisting of 27 loads, was fetched, and was calculated to be worth over

1,300,000 pesos. It is stated that, taking into account silver tendered at the same time, the treasure reached the stupendous value of £3,500,000. The bargain was sealed as it were, in horrible fashion, by the murder of the wretched Inca, who was tied to a stake and strangled.

This act was merely the preliminary to a long catalogue of similar and worse atrocities. The land was completely ravaged for gold, and the population reduced to a state of slavery—that is to say, the pitiful remnant whose lives were spared. The population of Peru at the time of the Spanish invasion is considered to have numbered 15,000,000. In 1580 it had fallen to 8,250,000, whilst, after the lapse of two centuries, it barely exceeded 1,000,000 souls.

Although Brazil was discovered in the year 1500 by Vincente Yanez Puizon, one of the companions of Columbus, and the Pope had empowered its annexation, Spain, apparently not much impressed by its value, —from the only point of view then regarded as worth consideration, namely, that of gold—allowed it to fall under the domination of Portugal. Prior to this event taking place, Huguenots, oppressed in France their native land, obtained permission in the middle of the sixteenth century, to emigrate to Brazil. Here they founded the city of Rio-de-Janeiro, but, meeting with ill-treatment from the Spanish authorities, they ultimately returned home. Their departure was almost coincident with the occupation of Brazil by the Portuguese.

For about a century and a quarter, gold was washed in fitful fashion from the streams adjoining the Brazilian settlements. No active industry was carried on during the state of war between the two allies, Spain and Portugal, and other European nations. It was not

until the latter part of the seventeenth century that the attention of the Portuguese authorities was drawn to the importance of the mining industry, by an increasing quantity of gold, brought to the settlements by men of disreputable character, whose livelihood was derived from exploitation of the natives, and from practices probably still more questionable. A consignment, weighing a ton and a half, is said to have arrived in Lisbon in 1694, upon which the miners are reported to have rendered to the King of Portugal the usual royalty of one-fifth. The bulk of the precious metal was at first in the form of gold dust, which was actually for some considerable period, the currency of the country. Subsequently gold performed this function, until Colonial Mints had been established and were in a position to mint coin, whereupon, the circulation of gold dust and bars as money was prohibited.

Kelly's *Cambist* describes the process by which raw gold became money in the following words: "The gold dust deposited in the beds of various streams is a common right, but when found is by law bound to be carried to the Royal Smelting houses established in various districts where, one-fifth of it being retained for the Royal Quints, a bar is made of the remainder which is weighed, assayed, numbered, stamped, and returned to the owner accompanied by a certificate signed by the proper officers, showing the value of such bar, calculated at 1,500 Reis per octave of eleven-twelfths (·9167) fine. They are ultimately carried to the Royal Mint at Rio de Janeiro, where they are received at 1,500 Reis per octave, and paid for in gold coin valued at 1,600 Reis per octave, the King retaining a seignorage of 62·3 per cent., in addition to the Quinto (or 20 per cent.) previously taken in the gold dust."

The gold production of Brazil under Portuguese control,

was very substantial indeed. A well-known authority, the Abbe Raynal, states: "It is demonstrable from the registers of the fleets, that, in the space of sixty years, that is, from the discovery of the mines to the year 1756, 2,400,000,000 livres (about £96,000,000) worth of gold have been brought away from Brazil." Basing his calculation upon the foregoing Mr. Danson, in a paper read before the Statistical Society in London, estimated the production of Brazil from 1680 to 1803, as £184,400,000. Delmar, considers this total as an over estimate, and is disposed to put down the total yield from Mexico, from the discovery of the placers in 1670 to 1880, as £180,000,000. Much of this gold was marketed in Portugal and England, chiefly the latter, for, from 1703 to 1873, Portuguese records show that only £52,440,000 was coined in Brazil. The system of levying the King's fifth upon all gold produced proved an excellent invention for the sovereign authority, which must have profited to the extent of thirty to thirty-five millions sterling in bullion, in addition to the incidental advantages attaching to Government control of the mining industry.

CHAPTER IV

THE PRODUCTION OF THE NINETEENTH CENTURY

TURNING to the production of more recent times, we find several new sources of supply. The existence of gold in lower California appears to have been known to Cortes, and is mentioned occasionally in the historical records of succeeding centuries, but it was not until the year 1848 that California entered upon a career that carried it for a while into a predominant position among gold producing countries. The discovery was owing to the action of a little girl, the daughter of a man named Marshall, the overseer of a mill for which a race was being dug in the American fork of the Sacramento. The child showed her father "a pretty stone" which she had found, and the discovery led to a yield of two hundred and twenty million pounds' worth of gold within about thirty years. Since then, this State has been a constant and substantial producer, and figures in the Government Returns of 1916, with a yield of 1,063,302 oz., or nearly £4,500,000 sterling, heading the list of the gold producing States of the American Union. The second on the list is Colorado with 928,074 oz., followed by Alaska with 780,037 oz.

An interesting and very successful development of the processes for gold recovery is responsible for a large proportion of the recent output of California and Alaska. Large mechanical dredges have been installed upon the waterways of these, and other States of the Union, and the precious metal is harvested by somewhat similar methods to those adopted by fishers at sea. The United States Geological Survey furnishes

the following figures of the Dredge output of gold in the United States of America from 1896 to 1916—

Year.	*California.*	*Alaska.*	*Total United States, including Alaska.*	
			Dredges.	*Recovery.*
1896	$2,000	—	2	$44,000
1897	5,000	—	6	118,556
1898	18,887	—	8	187,700
1899	206,302	—	18	434,178
1900	200,929	—	27	520,037
1901	471,762	—	34	740,013
1902	867,665	—	48	1,369,522
1903	1,475,749	$20,000	45	1,916,064
1904	2,187,038	25,000	61	2,723,717
1905	3,276,141	40,000	68	3,687,376
1906	5,098,359	120,000	76	5,721,394
1907	5,065,437	250,000	79	5,665,702
1908	6,536,189	170,901	88	7,353,571
1909	7,382,950	424,993	96	8,783,599
1910	7,550,254	800,000	115	9,293,040
1911	7,666,461	1,500,000	119	10,326,369
1912	7,429,955	2,200,000	124	11,218,911
1913	8,090,294	2,200,000	116	12,226,936
1914	7,783,394	2,350,000	120	12,512,783
1915	7,796,465	2,330,000	115	12,483,125
1916	7,769,227	2,679,000	113	12,786,614
TOTAL	$86,880,458	$15,109,894		$120,103,117

Aborigines had frequented the river banks of Australian rivers from time immemorial, without concerning themselves about the gold dust deposited by the action of the running water; though, it is said, sometimes they tipped their arrow-heads with gold. Count Strzelecke forwarded a report to this country in 1840, to the effect that he had found auriferous pyrites in the preceding year, but he was urged by the Governor to keep his discovery secret least the convicts—numbering some 45,000—should become unsettled. It was

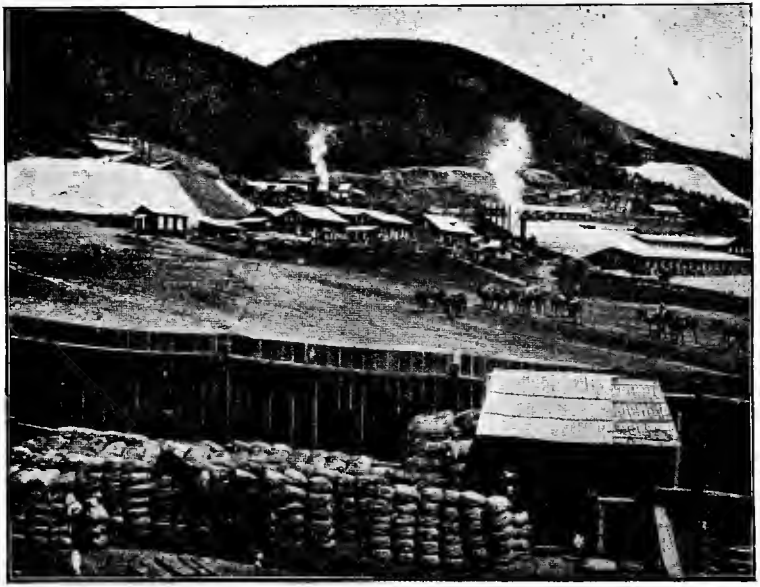

Photo by *The Exclusive News Agency*

ESPERANZA GOLD MINE, MEX CO.

left to a gentleman named Hargreaves, to whom the geology of the district was familiar, to take some baskets of soil near Bathurst, one hundred miles west of Sydney, New South Wales, in February, 1851, and wash the contents, and thus obtain a quantity of gold. The news spread quickly, and the episode was succeeded by similar discoveries in Victoria during the same year.

In October, 7,000 miners were keenly engaged at work, and before the year closed, some £900,000 of gold was obtained from the labours of about 16,000 miners. By 1852, the number of persons engaged in the industry had risen to 150,000, and the output to £20,600,000.

This proved the high-water mark, from which the yield has fallen to about £8,300,000 in 1916. At the gold diggings in Australia, one "rocker" or cradle can wash up to one thousand bushels of gravel or sand a day. The cost of a machine used only to be between five and six pounds sterling. Simpler methods are often employed to wash the sands of rivers, preferably where floods have carried the gold into gullies. The earth is put into shallow metal pans, flushed with water, and the muddy liquid, carrying the non-metallic matter, is thrown into the river. This process is repeated constantly until the particles of gold become visible. Shallow wooden troughs are sometimes employed, lined with coarse cloth, or even composed of rough boards alone. These are placed on an incline, and a gentle stream of water introduced, into which the sand is thrown. The gold is found clinging to the cloth, or to the interstices of the boards. The simplicity of the apparatus required for garnering gold from alluvial deposits is a great contrast to that demanded for dealing with gold embedded in pyrites and quartz rock. Crushing

machines and stampers, expensive in manufacture as well as in running, have to be set up, by which the hard material can be crushed. Before even these can be employed, the ore has in some cases to be rendered brittle enough for crushing by subjection to the action of fire.

In many cases water has to be brought to the mines from a distance, for without its help, crushing is almost useless. The collection of the gold from the pulverized ore also presents difficulties to which alluvial mining is not subject.

Russia possessed a gold-bearing area, which became an important factor of the world's production about the middle of the nineteenth century. The first discovery of gold of consequence was in 1774, near the town of Ekaterinburg in the Berezof region. As the Government retained practically a monopoly of the gold mining industry in its own hands, development was extremely slow until the year 1812, when encouragement was given to private enterprise. As a result, prospectors sounded the possibilities of Siberia, and an industry was set in motion which will have far reaching consequences when its little known wide spaces are regularly worked for the precious material to be found in rock and sand. It is only in Russia and in the Transvaal that gold mining is really active as a separate industry; elsewhere it is mostly a side issue of other mining operations.

Alluvial deposits and quartz veins bearing gold are being worked in the Urals and in Western and Eastern Siberia. The last mentioned district is responsible for three-quarters, the first for one-sixth, and the second for one-eighteenth of the total Russian output. Reef gold is the staple of the Urals, whilst in Eastern Siberia dredging is the given principal means of

recovery. The gold production of Russia has been given as follows—

Period.	*Mean Annual Production of Gold. Ounces Fine.*
1814–1820	7·930
1821–1830	90·760
1831–1840	186·020
1841–1850	584·130
1851–1860	680·210
1861–1870	717·740
1871–1880	1,003·600
1881–1890	945·690
1891–1900	1,066·120
1901–1910	1,188·520
1911–1912	1,580,040
1913	1,609,700
1914	1,382,800
1915	1,273,400

THE RAND. Last, but chief of all in importance, came the wonderful discoveries in South Africa. It has already been remarked that gold mining has had an important influence upon the history of nations, in some cases, even to the extent of their rise and fall. No more telling instance can be cited than that fresh in the memory of the present generation, in connection with the deposits of gold in the district styled the Rand (a Dutch word signifying "Ridge"). The Boer people, a sturdy independent race, clinging tenaciously to self-centred conservatism, had trekked persistently from the Cape up country, in order to avoid an incoming tide of Europeans (mostly British, and saturated with progressive ideas), ultimately setting up their homesteads under the shadow of the mountain range, which abuts the Vaal river. Here they enjoyed for many years self-government and a

measure of success from farming, involving a somewhat stolid existence, varied by armed conflict with the neighbouring tribes, whose favour they failed to win, owing to their harsh and overbearing attitude. To ensure peaceful enjoyment of their territory, nay, their very existence, the aid of the British Government became necessary, and, as a necessary result of their position on the map, it was arranged by treaty that the foreign relations of the Transvaal Government should be transacted through Great Britain alone.

Such was the condition of affairs until in 1868 President Pretorius, impelled by the increasing poverty of his State, reversed the policy of his predecessors, who discouraged prospecting for gold within the boundaries of the Republic. Gold was soon discovered —in the Sutherland Hills in 1869, and in 1870 in the Murchison Range. In the following year a mining commissioner was appointed, and the first gold mining law enacted. It was not, however, until 1885, when deposits were found in the Witwatersrand, that the mining industry began to surge forward with an impetus, which carried it to an extent unequalled in any previous age.

Toward the end of 1886 the township of Johannesberg was marked out, and in June of the next year shares began to be quoted in the Johannesburg Stock Exchange. By November, sixty-eight companies had been launched, the nominal capital of which amounted to £3,000,000.

The effect of the new industry upon the finances and prosperity of the State became speedily evident, and the revenue rose from £177,406 in 1882, to £2,247,728 in 1894. Of the latter sum the official Mining Department was responsible for £972,311 or no less than 43¼ per cent. The Burgers of the Republic were wise enough

to frame their mining laws on the assumption that the precious metals beneath the soil belonged to the State. This principle is likely to gain ground in other communities, for it is not reasonable that owners of landed property, whose title has been obtained on the score of surface rights, should, as a matter of course, enjoy the chief advantage of accidental discoveries of wealth beneath the soil. Such advantages should accrue in fair proportion to the energy of the workman, the enterprise of the capitalist, who exploits them, and to the State, by whose wise and fostering care, enterprise can alone obtain due protection. On the whole the Transvaal mining laws observed these conditions and the industry prospered to such a degree that the gold output of the Rand rose from £12,000 in 1887, to £14,875,000 in 1889—more than twenty thousand fold.

Meanwhile, however, serious difficulties had arisen with regard to the civil population. The influx of the miners, and the numerous folk who essayed the profitable task of attending to their material wants, presented a problem difficult of solution except upon progressive lines. If the Transvaal Republic were to gain in prosperity by the admission of an intelligent white population for the prosecution of the mining industry (as they did eventually in such numbers that the newcomers several times exceeded the original Boer inhabitants of the district), civil rights—such as any self-respecting community expects—had to be conceded. This was the more necessary as South Africa possessed a black population which was kept mainly in control by the prestige of Great Britain, the predominant power in South Africa. Delay on the part of the Boer Government to grant reasonable admission of the new comers to a fair measure of citizenship, had the inevitable result of provoking friction, which led to the regrettable

Jameson Raid, an action unauthorized and immediately repudiated by the British Government. At this moment, when public feeling in Great Britain was sore, and humiliated by the indiscretion of the raiders, the German Emperor launched a telegram, congratulating President Krüger upon having repelled successfully the invasion of his territory. Inasmuch as the Transvaal was debarred from direct foreign relations, by treaty with Great Britain, only one reply was possible in order to meet the situation. The British Fleet was mobilized, and a squadron at once despatched to South Africa.

As a result of this contretemps with Germany, the discovery of the great goldfields of the Transvaal actually became a link in the chain of events which led to the Great War of 1914; for, from the moment when Great Britain found it necessary to assert her sovereign rights by a display of Naval strength, Germany embarked upon a Naval programme, that evidenced her determination to be in a better position on the next occasion to pursue her foreign policy with a display of force. The fateful telegram had another effect. It made it imperative for Great Britain to take steps that would ensure a permanent settlement of the matters at issue between the Transvaal Republic and herself as the Sovereign power. The unyielding attitude of the Republic in subsequent negotiations caused the South African War, during which the output of the gold mines necessarily was curtailed.

The yield fell from £14,875,000 in 1899, to £1,014,687 in 1901. A report was disseminated throughout the Continent, by those who had intrigued against the exercise by Great Britain of her sovereign rights with regard to the Transvaal, that the war had been brought about in order to acquire the goldfields. The statement has only to be examined for its absurdity to be manifest.

The shares of the companies continued to be held by the purchasers whatever their nationality, and the Local Government received the Royalties upon the produce of the mines as it did before the war. The Government of Great Britain drew no monetary advantage from the successful issue of the war; on the

By courtesy of *Messrs. W. C. Griffith and Co.*

MODEL OF THE "WELCOME" GOLD-NUGGET

(Found June 11th, 1858, at Bakery Hill, Ballaarat, Australia containing: Pure Gold 2019¾ oz. Value £8,376 10s. 10d.)

contrary, it arranged that the whole cost of the war should fall upon the people of the United Kingdom.

What the war really brought about was a United South Africa, protected from external aggression and interference by the broad aegis of British protection, and an Imperial guarantee that the mixed populace, drawn into the Transvaal by the mines, should possess

equal rights, and that the mining industry should possess that unchecked development which was necessary for its success. To such an extent did this prove the case that between 1903 and 1916, the output was more than trebled. The total production for 1916 was £39,500,000, and this total has, up to the present time, represented high-water mark. The figure is stupendous, and absolutely outranges the annual production of any one minefield, or of any one country since the beginning of time.

The auriferous reefs of the Transvaal are composed of conglomerate or stones, rounded as a result of water action, and there compacted into solid rock. This forms the so-called "banker" or pudding stone, the rounded pebbles contained in it being the plums in the pudding. Mr. W. Bleloch thus describes their setting in the *New South Africa:* "The main geological features of this wonderful formation and its relative position may be thus briefly described. The basement rock appears to be the granite which is found outcropping a few miles north of Johannesburg. Shelving up towards the granite there is a succession of quartzites and shales known as the Hospital Hill series, a name given because the hill where they are most prominently exposed runs directly behind the Johannesburg Hospital. Then come the beds of the Witwatersrand series, quartzites and conglomerates, with the same sloping dip to the south. Next in succession there is an intrusive rock known as the Klipriversberg amygdaloidal diabase, which has been erupted later than the period of disposition of the Witwatersrand series. Resting on this diabase at some places, and at others on the Witwatersrand rocks, there is another small series of conglomerates and quartzites known as the Black Reef formation. This formation is uncomformable to the Witwatersrand series

proper. At some places it completely covers the upturned edges of the older series, but at others, as along the Rand at Johannesburg, it is worn away and leaves them exposed. It is like an old mantle, through whose worn out patches one can partly see what lies below. Above the Black Reef formation is a thick bed of dolomite, and then the rocks of the Gatsrand. These latter are represented on the north by those of the Magaliesberg, and there is little doubt that they at one time covered the whole anticline of the Rand, the crest of which is now denuded."

The reefs slant downwards to a considerable depth, and the angle of the descent is so dependable that the most accurate estimates are made by experts as to where they can be cut by shafts, and it is also possible to forecast approximately the probably output over any breadth of ground. Mr. Bleloch wrote in 1901 as follows—

" There is still another means of checking the result, and that is a consideration of the rate of production preceding the outbreak of the war. The official returns for the nine working months of 1889 showed a production at the rate of about £20,000,000 a year, equivalent to £2,000,000,000 in a hundred years. The rate of production will *possibly double itself* within fifteen years after the war; if so, in fifty years' time the product from the Rand will have reached over £2,000,000,000, and, if such an accelerated rate of progress is made, the whole of the vast amount now estimated may be dug out of the Rand within sixty or seventy years. It greatly depends on the labour supplies, and on the capital invested. Regarding the former, there may be some difficulty, but about the latter there need be no fear, because not only have the great houses of the Rand enormous reserves of their own, but under new

and enlightened government such a goldfield is sure to attract plentiful supplies of fresh capital.

Nor need it be considered such an extraordinary thing to mine and treat the tonnage of ore presumed. As has already been remarked, these conglomerate reefs of the Rand are similar, so far as regularity and other mining considerations are concerned, to coal beds. The output of coal from Great Britain is over 200,000,000 tons per annum, and if a similar rate of production could be obtained on the Rand, the 1,378,000,000 tons estimated would be worked out in seven years. Of course this speed is impracticable; but it is possible, and highly probable, too, that such an amount will be extracted within the present century. The aggregate of the gold production of the world for the forty-five years between 1850 and 1896 was given by the *Statist* some years back at £1,163,000,000, of which the United States had produced £417,980,000, and Victoria £243,841,000."

The prediction given at the beginning of this extract, is very accurate for, as already stated, the annual production of 1916 was approximately £39,500,000. The yield, appears to have reached its zenith, and in the ordinary course is expected to decline considerably as time progresses. It is not now considered likely that the total will reach the estimate of Mr. Bleloch.

One limit to the production of this wonderful minefield is that set by the depth at which operations can be carried on. It is a well-known fact that heat increases at depth, although the scale of temperature is not always uniform with the descent. The heat at 3,000 ft. depth in parts of Western America is almost too much to be borne, whilst at a depth of 4,400 ft. in the Calumet and Hecla mine in Michigan, there is only a rise of 4°F., even though no artificial ventilation is employed. Heat

appears to be generated either by the decomposition of mineral matter, by the proximity of hot springs, or of rocks affected by the world's internal fires. It is evident, however, that deep mining at depth must cease, when it is carried to a point where the temperature exceeds power of human endurance. Ventilation, however skilfully applied, can only abate a stifling atmosphere to a limited extent.

Up to the close of 1917, the total production of the Rand amounted to £528,000,000. The annual output seems now to have reached the highest level it is likely to obtain.

Mr. Joseph Kitchin has been good enough to furnish the following interesting matter as to the situation and origin of the Reefs, and to supply the tabulated details as to the progressive character of the Rand mining industry, with which this chapter concludes.

The reefs go down to indefinite depth, and are like flat beds tilted at the outcrop. They start with a dip of say 50°, and then quickly flatten to 40°, 30°, 20°, and even to 10° in existing workings, that is to say, the 50° and 40° dips are local to the surface, but the 10° and 20° dips represent the general level below the ground. The formation can be likened to a saucer, *i.e.*, it is in general of a flat shape but has upturned edges. In other words, the reefs start downwards from the surface, rapidly flatten with depth, and then continue at a more or less uniform and obtuse angle for an indefinite distance, until they reach the limits of their properties, where they are respectively located.

As to the origin of the formation, the river-bed theory was suggested a great many years ago, but has been discarded. Recently a delta theory has been put forward—*i.e.*, a huge river like the Yellow River is imagined as having discharged itself from the *north*

of the Rand reefs the discharge spreading out southwards in delta fashion, and so carrying the pebbles of the present beds to their present position. There is also the older idea (more widely held) of the beds having been laid down (like our sea-shore beaches), at the constantly receding edge of a sea. As the beds are hundreds in number, the sea would have had to ebb and flow hundreds of times in order to deposit them, and the sand, stone, etc., that lie between. The tilting of these flat beaches is suggested to have been caused by the granite intrusion from the north. There is really no satisfying or generally accepted theory of the reefs, but *the fact* of their existence is there. Given the origin of the beds, how did the gold get into them? It must have been after the pebbles were laid, and before they became compacted in the matrix, for the latter contains the gold—the pebbles are gold-less. Some think that the gold got there by placer action—as in the Western United States—others that it was carried there in solution and then deposited in the interstices between the pebbles—others that it was the product of igneous action.

In the attached record of the Rand's production the Chamber of Mines' figures (except as to New Issues) are taken throughout, excluding the Nigel district. The per ton and proportion figures are independently worked out from the Chamber's figures, and cost per ton is taken as the difference between yield and working profit per ton.

	Milled. Tons.	*Yield.* Total.	*Cost.* Per Ton.	Per Ton.	*Working Profit.* Total.	Per Ton.	*Dividends.* Total.	*Per Ton.*	*Proportion to Yield of:* Profits. %	Dividends. %
1887	12,000[1]	£81,045	135/-	—	—	—	£12 976	21/6	—	16·0
1888	180,000[1]	725,384	80/6	—	—	—	112,802	12/6	—	15·5
1899	380,000[1]	1,287,568	67/6	—	—	—	430,669	22/8	—	33·5
1890	750,000[1]	1,687,890	45/-	—	—	—	254,557	6/9	—	15·2
1891	1,240,000[1]	2,489,329	40/2	—	—	—	336,948	5/5	—	13·5
1892	1,961,324	4,104,319	41/10	—	—	—	805,583	8/3	—	19·6
1893	2,193,140	5,028,973	45/10	—	—	—	884,223	8/1	—	17·6
1894	2,805,375	6,784,874	48/5	—	—	—	1,453,899	10/4	—	21·4
1895	3,427,281	7,699,569	44/11	—	—	—	2,021,452	11/9	—	26·2
1896	3,984,248	7,783,363	39/1	—	—	—	1,520,282	7/7	—	19·5
1897	5,314,860	10,545,795	39/8	—	—	—	2,713,781	10/2	—	25·7
1898	7,282,078	15,006,080	41/2	—	—	—	4,854,838	13/4	—	32·3
1899[2]	6,800,000	14,875,000	43/9	—	—	—	2,919,694	8/7	—	19·6
1900[2]	465,000	1,510,000	65/-	—	—	—	6,600	/3	—	0·4
1901	412,006	10,014,687	49/3	—	—	—	422,413	20/6	—	41·7
1902	3,410,735	7,153,770	42/-	—	—	—	2,127,726	12/5	—	29·7
1903	6,071,908	12,031,037	39/7	24/8	4,500,000	14/11	3,340,947	10/11	37·5	27·8
1904	8,022,736	15,434,422	38/6	24/4	5,600,000	14/2	3,832,819	9/7	36·3	24·8
1905	11,160,422	19,991,658	35/10	23/4	7,000,000	12/6	4,756,527	8/6[1]	35·0	23·8
1906	13,571,554	23,615,400	34/9	22/3	8,500,000	12/6	5,572,569	8/3	36·0	23·7
1907	15,523,229	26,421,837	34/1	20/10	10,300,000	13/3	6,929,020	8/11	39·0	26·2
1908	18,196,589	28,910,393	31/8	18/5	12,011,227	13/3	8,543,373	9/4	41·6	29·6
1909	20,543,759	29,900,359	29/1	17/7	11,794,376	11/6	9,329,251	9/1	39·4	31·2
1910	21,432,541	30,703,912	28/9	18/2	11,216,105	10/6	8,887,185	8/3	36·6	29·0
1911	23,888,258	33,543,479	28/1	18/6	11,415,861	9/7	7,763,086	6/6	34·0	23·1
1912[3]	25,486,361	27,182,795	29/3	19/3	12,678,095	10/-	7,960,394	6/3	34·0	21·4
1913	25,628,432	35,812,605	27/11	18/5	12,189,105	9/6	8,194,099	6/5	33·9	22·8
1914	25,701,954	34,124,434	26/6	17/6	11,653,597	9/-	8,073,436	6/3	33·9	23·7
1915	28,314,579	37,264,992	26/3	17/10	11,931,062	8/5	7,519,416	5/4	32·0	20·4
1916	28,525,252	38,107,909	26/9	18/7	11,630,001	8/2	7,095,066	5/-	30·5	18·6
1917	27,251,960	37,017,633	27/1	19/7	10,225,638	2/6	6,556,188	4/10	27·6	17·7

[1]Partly estimated, the declared quantities being 5,328, 106,910, 315,463, 705,219, and 1,148,772 tons for the 5 years to 1891.

[2]Years of the War, which renders comparisons fallacious. The yields and tons are gleaned from Chamber figures, except that between 1900 and 1899 have been (proportionately to yield) allotted as to 465,000 to 1900 and the balance to 1899.

[3]Including £367,991 (3½d. per ton) of gold reserves specially declared in January and March. The Cost Per Ton is not Chamber of Mines Reports, but the difference between Yield and Working Profit.

(1467E)—*bat. pp.* 48–49

CHAPTER V

PRESENT PRODUCTION AND PROSPECTS

No tabulated statistics are available as to the production of the world, previous to those of the last 400 years. Some idea of the ancient output can be gained from investigating historical data, but writers of the far distant centuries before the Christian era appear to have laboured more for effect than for accuracy. Indeed, many of their statements betray a vague or reckless use of figures, which renders them valueless to the statistician.

Again, communications between one Continent and another were occasional and subject to interruptions of long continuance. Civilizations, distinct in type and really advanced in their respective character, were contemporary in diverse continents, but not in touch with each other. Hence, in order to arrive at the world production of gold, information gathered from ancient European sources as to European production, gives little suggestion as to whether a like development of mining industry existed in Asia, Africa, or America, whilst ancient records from the last named continents lend very slight assistance as to their local output.

Ornaments, buried beneath, and ultimately recovered from the soil do not prove the existence of gold mining in the neighbourhood, for, as in modern times, gold used to travel far from the place of origin, in exchange for commodities more vital to the needs of the miners.

The production must have varied considerably after the Christian era owing to the frequent wars, which often reduced the yield in Europe to a minimum.

THE WORLD'S PRODUCTION SINCE 1493

Period.	Annual Average for Period. Fine Ounces.	Value.	Total for Period. Fine Ounces.	Value.
1493–1520	186,470	$3,855,000	5,221,160	$107,931,000
1521–1544	230,194	4,759,000	5,524,656	114,205,000
1545–1560	273,596	5,656,000	4,377,544	90,492,000
1561–1580	219,906	4,546,000	4,398,120	90,917,000
1581–1600	237,267	4,905,000	4,745,340	98,095,000
1601–1620	273,918	5,662,000	5,478,360	113,248,000
1612–1640	266,845	5,516,000	5,336,900	110,324,000
1641–1660	281,955	5,828,000	5,639,110	116,571,000
1661–1680	297,709	6,154,000	5,954,180	123,084,000
1681–1700	346,095	7,154,000	6,921,895	143,088,000
1701–1720	412,163	8,520,000	8,243,260	170,403,000
1721–1740	613,422	12,681,000	12,268,440	253,611,000
1741–1760	791,211	16,356,000	15,824,230	327,116,000
1761–1780	665,666	13,761,000	13,313,315	275,211,000
1781–1800	571,948	11,823,000	11,438,970	236,464,000
1801–1810	571,563	11,815,000	5,715,627	118,152,000
1811–1820	367,957	7,606,000	3,679,568	76,063,000
1821–1830	457,044	9,448,000	4,570,444	94,479,000
1831–1840	652,291	13,484,000	6,522,913	134,841,000
1841–1850	1,760,502	36,393,000	17,605,018	363,928,000
1851–1855	6,410,324	132,513,000	32,051,621	662,566,000
1856–1860	6,486,262	134,083,000	32,431,312	670,415,000
1861–1865	5,949,582	122,989,000	29,747,913	614,944,000
1866–1870	6,270,086	129,614,000	31,350,430	648,071,000
1871–1875	5,591,014	115,577,000	27,955,068	577,883,000
1876–1880	5,543,110	114,586,000	27,715,550	572,931,000
1881–1885	4,794,755	99,116,000	23,973,773	495,582,000
1886–1890	5,461,282	112,895,000	27,306,411	564,474,000
1891–1895	7,882,565	162,947,000	39,412,823	814,736,000
1896–1900	12,446,939	257,301,100	62,234,698	1,286,505,400
1901–1905	15,606,730	322,619,800	78,033,650	1,613,099,100
1906	—	—	19,471,080	402,503,000
1907	—	—	19,977,260	412,966,600
1908	—	—	21,422,244	442,836,900
1909	—	—	21,965,111	454,059,100
1910	—	—	22,022,180	455,239,100
1911	—	—	22,348,313	461,939,700
1912	—	—	22,549,335	466,136,100
1913	—	—	22,249,596	459,941,100
1914	—	—	22,039,548	455,676,600
1915	—	—	22,674,568	468,724,918
1916	—	—	22,107,669	457,006,045
1917	—	—	21,240,416	439,078,260
			22,758,808	470,466,214
			21,970,788	444,176,500
			20,491,176	423,590,200
			823,558,606	$17,012,362,274

Nothing is so deleterious to the success of mining than war, for this industry requires security for its operations and an abundance of manpower.

Failing accurate data, even the totals given of world production up to comparatively recent times by various authorities are merely estimates. Toward the latter part of the nineteenth century, however, reliable returns began to be made periodically and it became possible in recent years for the collection of statistics as to the yield of gold and silver to be really systematized. This useful innovation was brought about by the enterprise of the United States of America, which issues a compendious and always interesting official report each year, compiled by the Director of the United States Mint. This volume is recognized as the chief authority with regard to the precious metals. The fact that the details relating to foreign countries are obtained through official sources adds to its value. The report gives the production of the world since the discovery of America, as shown on page 50.

The report of the Director of the United States Mines for 1917, thus gives the production of the respective countries throughout the world for 1916, as shown on the following page.

In some cases, failing fresh data, the production of a preceding year has been inserted.

It is a very invidious task to seek to forecast the production of the precious metals. Mr. Alexander Delmar in his important work, *The History of the Precious Metals*, dated 1880, concludes with the following words—

" With regard to the probable future supplies of the precious metals, the author can speak from personal observation only of the mines of the Pacific Coast. These, however, are the most prolific of the world. This observation supported by a careful enquiry into

THE WORLD'S PRODUCTION FOR 1916

Country.	*Kilos Fine.*	*Gold, Ounces Fine.*	*Value in Dollars.*
	BY COUNTRIES.		
NORTH AMERICA—			
United States	139,317	4,479,057	$92,590,300
Canada	28,942	930,492	19,234,976
Mexico	11,572	372,038	7,690,707
TOTAL	179,831	5,781,587	119,515,983
Central American States	5,293	170,164	3,517,597
SOUTH AMERICA—			
Argentina	10	306	6,330
Bolivia and Chile	597	19,201	396,922
Brazil	3,648	117,286	2,424,515
Columbia	9,290	298,661	6,173,867
Ecuador	821	26,397	545,674
Peru	1,775	57,060	1,179,537
Uruguay	18	573	11,836
Guiana—British	1,155	37,129	767,525
,, Dutch	659	21,199	438,223
,, French	2,949	94,805	1,959,793
Venezuela	2,144	68,931	1,424,930
TOTAL	23,066	741,548	15,329,152
EUROPE—			
Austria-Hungary	2,095	67,360	1,392,465
France	1,505	48,375	1,000,000
Great Britain	29	926	19,142
Greece	—	—	—
Italy	3	111	2,295
Norway	—	—	—
Portugal	1	32	661
Russia	39,607	1,273,362	26,332,746
Spain	—	—	—
Sweden	38	1,225	25,323
Turkey	—	—	—
TOTAL	43,278	1,391,391	28,762,632
AUSTRALIA—			
New South Wales	3,364	108,145	2,235,556
Northern Territory	26	836	17,281
Queensland	6,692	215,162	4,447,793
South Australia	130	4,180	86,399
Victoria	7,983	256,643	5,305,282
Western Australia	33,014	1,061,398	21,941,044
New Zealand	9,102	292,620	6,048,992
Tasmania	491	15,790	326,408
TOTAL	60,802	1,954,774	$40,408,755

THE WORLD'S PRODUCTION FOR 1916—*continued*

Country.	*Kilos Fine.*	*Gold. Ounces Fine.*	*Value in Dollars.*
ASIA—	BY COUNTRIES.		
British India	16,862	542,115	11,206,509
China	4,220	135,677	2,804,692
Chosen	6,203	199,419	4,122,351
East Indies—British	4,664	149,963	3,100,000
„ „ Dutch	—	—	—
Federated Malay States	493	15,861	327,871
Formosa (Taiwan)	1,506	48,432	1,001,178
Indo-China	99	3,174	65,620
Japan	8,104	260,551	5,386,066
TOTAL	42,151	1,355,192	28,014,287
AFRICA—			
Belgian Congo	1,549	49,787	1,029,189
Egypt	218	7,010	144,910
French East Africa	65	2,100	43,414
Madagascar	1,452	46,681	964,980
Rhodesia	28,938	930,356	19,232,165
Transvaal, Cape Colony and Natal	289,171	9,296,848	192,182,902
West Africa	11,827	380,231	7,860,079
TOTAL	333,220	10,713,013	221,457,639
TOTAL FOR WORLD	687,641	22,107,669	$457,006,045

the conditions of mining, leads him to the conclusion that, whatever may be the merits and prospects of particular mines and districts, the total supplies of both metals, and particularly of gold, will continue to diminish. As to the mines of other countries, he has endeavoured to exercise as much care, and impartiality in the acceptance, examination, and comparison of data bearing upon the subject as he could command, and the result is that, in respect of them, he has been forced to a similar conclusion. Whatever may be the interests or wishes of the world upon the subject, it seems but too evident that the future supplies of these metals will not only fail to keep pace with the growth

of population and commerce, but that they *will absolutely diminish.*"

This passage has not been quoted with any idea of disparaging Mr. Delmar's book, embodying a wealth of research and painstaking accuracy, but merely to show how widely sundered are the realms of fact and speculation, and that, where so skilled and reliable an author has failed, no lesser man can hope to succeed, except by mere accident. The following figures show how different the event has proved.

The world production of the precious metals as given by the Director of the United States Mint at the period at which he wrote and in the most favourable subsequent year—

	1880.	1913.
Gold in Ounces .	5,543,110	22,249,596
Silver in Ounces .	78,775,602	223,907,843

that is to say the yield of gold has been quadrupled, and that of silver trebled.

The prediction failed to take into account the discovery of fresh deposits, and of the advance of metallurgical science. The researches of Mr. Delmar had impregnated his mind with the association of gold and existing rivers, and he had not allowed for the possibility of an enormous ancient river bed, saturated with gold, being titled up by nature to such an angle, that the chief limit to its exploitation seems to be its depth from the surface line. From the district subject to this remarkable natural phenomenon, the Rand, more than 50 per cent. of the world's production has been obtained in one year alone, nor would this amount have been possible, were it not for the invention of the cyanide process.

Hence it would be rash to assume that science has reached limits as to the extraction of gold from any base matter in which it is embodied. The writer has

	1917. £	1916. £	1915 £
Transvaal	38,323,921	39,485,000	38,627,500
Rhodesia	3,495,353	3,895,000	3,823,000
West Africa	1,529,970	1,615,000	1,706,500
TOTAL—Africa	£43,349,244	£44,496,000	£44,147,000
West Australia	4,121,700	4,508,500	5,140,000
Queensland	774,800	914,000	1,061,000
Victoria	869,400	1,090,000	1,398,000
New South Wales	361,400	459,000	563,000
South Australia	21,200	35,500	30,000
New Zealand	1,189,200	1,199,000	1,694,000
Tasmania	63,700	112,000	78,000
TOTAL—Australasia	£7,401,400	£8,308,000	£9,964,000
India	2,213,800	2,295,000	2,366,000
Canada	3,174,586	3,952,500	3,900,000
TOTAL—British Commonwealth	£56,139,030	£59,550,500	£60,377,000
World's Production	87,983,130	94,063,000	96,525,000
Contribution of British Commonwealth	63·8 [a]	62·9%	62·5%

handled a pellet of fine gold, derived from sea water, in which the precious metal is diffused to an almost imperceptible degree. A day may come, when by electrical or some other source of energy, the sea shall deliver

up continuously the minute proportion of gold that it contains. Then, given the almost illimitable oceans from which to draw, who would dare set a limit to the annual production of this metal ?

One of the most remarkable points about the present production of gold is the large size of that proportion derived from the territories owing allegiance to the British Crown. The table on page 55 details the way in which the total was made up in the years 1914 to 1916 inclusive; in accordance with figures published in the *Statist.*

During the Great War this fact rendered important service to the Allied countries, by assisting finance with neutral countries. So urgent was the need, especially in the earlier stages of the struggle, for increased importation of goods—either to relieve the strain upon the industrial population of the United Kingdom arising from depletion of man-power, or from the diversion of their energies to the work of munitions, etc., in order to equip and maintain the growing armies in the field, that exports failed to balance imports, and gold was required to effect payment for the adverse balance. In these circumstances a constant accession of about sixty millions sterling to the gold resources of Great Britain, was of valuable assistance in maintaining the credit and finance of the Allies in the markets of the world.

After the war, the control of this output could, if necessary, continue to be vested in the hands of the Government, and thus enable the authorities to wield or amass gold reserves in such a way as to cope with the very difficult situation arising from indebtedness abroad, incurred as a consequence of war.

The extraordinary developments in the Rand dispose entirely of any assumption that the earth has yet yielded

up its principal treasures of gold. In the case of the Rand, the outcrop was barely concealed. It is possible that similar lodes may exist, which do not approach the actual surface, being so covered with vegetation and soil that accident alone can betray their presence. An instance of this character was the Cobalt silver mine fields in Ontario, where, in the course of making a new railway cutting, immense wealth of silver was discovered in ground which had been traversed by traders and others for centuries.

Nor must it be assumed that the world's surface has been examined scientifically, even in a cursory fashion, for traces of the precious metals. Wide tracts of Asia, especially the enormous area of Siberia, are still *terrae incognitae* in this respect. China has declined hitherto to allow the soil to be exploited for minerals, owing to its being the cemetery of uncounted past inhabitants. Here, in the long run, utilitarianism will prevail over sentiment. Africa has arid wastes, or wild expanses, as yet almost untrodden by a white man, where startling discoveries may happen at any moment. Notwithstanding the energy of the native born Americans, great possibilities still must be allowed to exist in the Northern Continent; whilst in the Southern, the extension of railway facilities and an increase of the civilized population must take place before a statement can be justified that the deposits discovered by the Spaniards in the sixteenth century represent its main contribution to the world's stock of precious metal. Australia's remarkable yield in the latter half of the nineteenth century, has not fulfilled the expectations awakened at the outset, but the *interior* of that great island, inhospitable and inaccessible as it is at the present moment, may yet reward the hardy pioneer by a gleam of gold worth the mining, though hitherto

it has not added to the world's production of the metal.

A significant indication of the truth of the preceding remarks is afforded by the following extract from the *Bullion Letter* of Messrs. Samuel Montagu & Co., dated 21st February, 1918—

"The territory of Chosen, now being developed by Japan, is considered to be very rich in various metals. The value of the gold mined and exported each year has risen from Yens 9,416,235 in 1912, to Yens 15,983,986 in 1916, a total increase of 70 per cent. So substantial an advance indicates that the production from this hitherto little exploited country may become eventually a considerable factor in the world's gold production."

The difficulties with regard to labour, and the constantly increasing cost of living, have been a heavy burden upon mining industry during the Great War. Nor has additional expense attached to labour alone, the cost of materials (chemicals, motive power and machinery) has mounted up by leaps and bounds. Commodities, such as cyanide for instance, necessary to the successful prosecution of modern mining have even been at times unobtainable, except for the purposes of war.

In these circumstances, some of the gold mining companies (especially those working low-grade ore), have been brought face to face with a serious problem. Should they close down, or work at a loss? It is remarkable that they should be brought to such a pass, considering that the acquisition of gold has been vital to the successful financing of Allied operations.

The reason why normally the price of gold does not rise in correspondence with the cost of other commodities is simple. It is, itself, the measure of value. This

does not mean that its value has not altered at various periods, for frequently that has taken place, but that the measure of the value of gold can only be ascertained by comparing the average price of commodities at those periods.

As a consequence of this measurement of its value by other commodities, the production of gold is affected correspondingly—that is to say, when prices generally are cheap, the output of gold is accelerated—new gold propositions are considered and prospecting is active. On the other hand, when prices stiffen, production languishes, as it has done recently in the abnormal conditions brought about by the Great War.

The above considerations are akin to the subject of the debt contracted by the vast military operations lately undertaken. The bulk of the many thousands of millions sterling of new Government indebtedness has been acquired when prices were high. If prices and wages fall to a lower level, the burden of the debt will be felt in like degree, other circumstances being equal. Whilst higher prices and wages would, other circumstances being equal, ease its weight upon the back of the community. Amongst these other circumstances must be counted the possibility of general activity in productive trade.

It is thus important to remember that the National Debt has been incurred upon the basis of gold. This does not mean, of course, that interest and principal will be paid in actual gold, but it does imply that their measurement will be in terms of this metal, unless the currency of the United Kingdom be placed upon some basis other than that which now obtains, namely, a gold pound, coined at the rate of 934½ pieces from 20 troy lbs. weight of standard gold (11/12ths fine).

Another point touching the production of gold is

worthy of mention. The *cost* of producing gold does not, like that in the case of other commodities, control its value—though it may affect, as already pointed out, the amount produced. This fact possibly owes its existence to the small proportion of gold which is dissipated continuously as compared with that which is consumed entirely of other commodities, and to the smallness of the annual output as compared with the stock already in existence.

After the Great War, there will be a strenuous effort on the part of the nations to repair its ravages, and, although food and clothing will be of primary importance, every effort will be made to make enlarged use of the world's resources of raw material, in the search for which, there is a reasonable possibility that gold will be found in localities not yet reckoned amongst those producing this metal.

CHAPTER VI

THE EVOLUTION OF BRITISH COINAGE

ELECTRUM, a compound of gold and silver, in the proportion of about 73 and 27 per cent., considered by some to be a natural compound, and not artificially created, was the substance first employed for coinage. Such was the material of which the State of Lydia minted and struck about the year 700 B.C., a bean-shaped piece of metal, supposed to be the first coin.

It is not proposed to deal in detail with the world-wide use of gold for coinage, as the space at disposal in this work is scanty, but to trace its development in relation to the coinage of England alone.

Specimens in existence prove that a British gold coin was in use prior to the Roman invasion, though it is indeed a weird production. The British designers appear to have intended to imitate the fine gold stater of Philip II, of Macedon, but, failing the necessary artistic skill, either for design or execution, they failed entirely to reproduce the chariot and horses on the reverse of the Macedonian coin, and merely evolved a remarkably odd collection of streaks, circles, dots, and dashes.

Lovers of Shakespeare will be interested to know that Cunobelline, the Cymbeline of the dramatist, minted a gold coin of passable design, about the beginning of our era. On the obverse was a prancing horse, and the letters C.V.N.O. and on the reverse a wheat-ear, the emblem of fecundity, and the word letters C.A.M.V.L. indicated his capital city, Camulodunum.

Few gold coins were produced in the Saxon period. Offa, King of Mercia (752–796 A.D.), was responsible

for a specimen (now in the British Museum), remarkable for its close imitation of the gold dinar of Al-Mansur, Caliph of Bagdad, grandfather of the famous Haroun al-Raschid, in whose day Arab coins became well-known throughout Western Europe. The royal seat of King Offa was at Kingsburn-on-the-Thame, and mints were set up at Tamworth (Tornei) Warwick (Weric), and Coventry. The Oriental design of the dies used by him originated from the fact that they were the work of Italian artists, who, at that period, affected Eastern styles of ornament.

For a period of about 600 years, from the riegn of Offa, the prevailing coin, composed of precious metal, was the silver penny. Its original weight was 24 gr., and thus it gave its name to the pennyweight. The first English gold piece, was a gold penny struck by Henry III, in the year 1257. Its weight was 45 gr., and it passed current as equal in value to twenty of the silver pennies of that day. It is a coin of considerable elegance, and bears a striking likeness to the coins of Byzantium, which, for a more or less continuous period of five centuries, had born an image of Christ. In somewhat similar fashion, Henry III sits upon his throne, holding the sceptre in his right hand, and the orb in his left. Like many of the coins of this period, the reverse bears a cross which divides the surface into four equal segments. Whether the object was to confer a religious character to the design, or was for the convenience of dividing the coin into four equal parts is not clear.

No other description of gold coin was minted until the time of Edward III, 1327–1377. During his long reign several varieties were issued, namely, a florin (6s.), half-florin, and quarter-florin, and a noble, (6s. 8d.), half-noble, and quarter-noble. Of the latter, Caxton

wrote: "Edward in his fourteenth year commanded his coin of gold to be made forthwith. The best that might be, that is to say, the florin that was called the noble." Such an adjective was justly applied to this coin which bore on the obverse a striking representation of a ship of the period flying the cross of St. George from its masthead. Upon its deck, stood an effigy of the King, exaggerated in size, holding a drawn sword in his right hand, and with his left a shield, upon which was quartered the arms of England and the arms of France. On the reverse, the centre consisted of the Letter E, set in the midst of a four petalled rose, displayed upon the limbs of the cross. The design was of a character to over-spread, but not to overcrowd either surface of the coin, and it produced a harmonious and pleasing effect which the medallion style of modern numismatic art often fails to elicit. There were three types issued, the weights of which were respectively: $138\frac{6}{13}$ grains, 128 grains, and $120\frac{4}{7}$ grains.

About a century elapsed before a new description of gold coin was minted. Various "Nobles" of diverse weights were struck, but it was left to the next Edward to devise a distinct new denomination. The weight of the noble was restored to 120 grains, its value raised to 10s., and a new name was given to it, of rose noble or ryal (royal). The King, bearing sword, and shield is shown seated in a vessel, as it were ruling the waves beneath. Another innovation was the angel, so-called from a dramatic design on the obverse, which portrayed the Archangel Michael spearing a prostrate dragon in the mouth. The legend on the full angel read *Per Crvcem. Tva Salva Nos Xpe Redempt.* The reverse bore the design of a ship, with a cross in the place of the mast, on the left side of which is the letter E, and on the right, the white rose of York, whilst beneath is a

shield combining the arms of England and France. The angel counted as 6s. 8d.

The first of the Tudors, Henry VII (1485–1509), introduced the sovereign (or double ryal), 20s., the progenitor of the modern coin of that name. From an artistic standpoint none of its successors need be ashamed of their descent. Its appearance resembles that of a superb seal. On the obverse, the King, full faced, holding sceptre in his right, and orb in his left hand, crown on head, and royally robed, is seated upon his throne. The reverse is covered with an elaborate design comprising the Tudor rose, centred in the arms of England and France combined. The inscription seems to have no apparent connection with the purpose for which it was used. "*Ihesvs. Avtem. Transiens: Per: Medivm: Illorum: Ibat.*" (But Jesus passing through the midst of them went his way.)

His successor, Henry VIII (1509–1547), was responsible for two new gold coins the double sovereign (44s. or 45s.), and the crown, or quarter sovereign (5s.). He was responsible also for other coinage matters which by no means redounded to his credit, for he debased gold and silver coinage alike in a most disgraceful fashion.

Edward VI (1547–1553), had ambitious ideas as to improving the coinage, for which his reign proved all too short. He projected a treble sovereign (60s.), and a six angel piece (48s.). The gold crown (5s.) for the first time shows the bust of the sovereign in profile, as do the coins of the present day.

The reign of James I (1603–1625), was signalized by the addition of the Scottish shield placed in the first quarter of the Arms, and a change in the title of the sovereign which now became "King of England, Scotland, France, and Ireland." A coin was issued called

the Unite (20s.), and also double and half-crowns in gold. His successor, Charles I (1625–1649), under the stress of untoward circumstances, minted coins of a very varied character. The mints turned out treble units (60s.), and half-units, 10s. pieces, as well as the descriptions of coins mentioned as issued in preceding reigns.

During the Protectorate a fifty-shilling piece was minted. The gold coins bore the phrase, now familiar from a long association with the coinage of the United States of America, *God With Us*.

Charles II (1660–1685) introduced a notable innovation—milling. This was applied to pieces of new denomination, namely, five guinea, two guinea, and half-guinea pieces. The name was derived from the fact that most of the gold employed by the Mint was then obtained from Guinea, by the African Co. A special Mint mark was used for this issue, namely, an elephant, or an elephant and castle inserted beneath the King's bust. The King's head is an unusually fine piece of portraiture. Guinea denominations ruled supreme during the next seven reigns. George I (1714–1727), added a quarter-guinea in 1718, and George III (1760–1820) a third-of-a-guinea. To the latter reign also belonged the special shield design, which gave the coins the name of Spade guineas. Otherwise little change took place in the coinage.

George IV (1820–1830), authorized gold coins of the same denominations as are current to-day, namely, the double sovereign, sovereign, and half-sovereign, with the exception of the five-sovereign piece, initiated by Victoria (1837–1901).

The reign of Edward VII (1901–1910) was signalized by an acknowledgment of British Territory beyond the seas in the legend on each coin. The style became *Brittaniarum Omnivm Rex* (King of all the Britons).

As to the quality of gold used for British coinage, the gold penny of Henry III was comprised of pure metal, whilst from the reign of Edward III to that of Henry VII inclusive, the standard observed was what is styled the old standard, which consisted of 23 carats and $3\frac{1}{2}$ grains of fine gold with half a grain of alloy. Henry VIII introduced a lower quality, called "crown" gold, comprised of 22 carats gold and two carats of alloy. This unscrupulous monarch subsequently brought the proportion down to 20 carats of gold and 4 of alloy. His successor approximated the old standard, to which Mary returned. Elizabeth resolutely set herself to restore inferior coin with such success that Bishop Jewel wrote to Peter Martyr of Zurich in 1562: "Queen Elizabeth has restored all our gold and silver coinage to its former value, and rendered it pure and unalloyed: a truly royal act and which you will wonder could have been effected in so short a time." Since her reign no debasement has taken place, and "crown" gold has been the standard, though occasionally pieces of the old standard were minted by James I and Charles I.

During the period of the Spanish domination of Mexico, and other territories in America, the major part of the world's supplies of gold passed through the hands of the Spanish Government, and was minted mostly into Spanish doubloons each of sixteen dollars. These pieces found currency in all parts of the civilized, and many portions of the uncivilized, world. So prodigious was the quantity coined, that for two hundred years and more after the date of issue, large parcels were bought and sold in the chief banking centres of Europe, and elsewhere. Consignments, some thousands of pounds in value, used to arrive by every South American mail ship up to about twenty-five years ago

The history of the Spanish doubloon is now of the past,

but that of the British gold sovereign has yet to be written. The fact that some 60 per cent. of the world's gold supplies is produced within British territory, and that London is the world capital, has caused the sovereign to take the place once occupied internationally by the Spanish doubloon. Its dissemination has been assisted for the far reaching tentacles of British trade, and by the fact that it has been created legal tender in India, as the equivalent of 15 rupees. It has been stated that the British sovereign resembles a bird in its nesting and migration propensities for often its stay in a country is very short, perhaps only during the period whilst crops are being financed. This remark applies particularly to Egypt, Turkey, and South America. India has absorbed steadily, and is likely to do so, except when a disastrous monsoon disturbs for a while the favourable balance of its trade.

The table on page 68 shows how important the coinage had become before the Great War.

It is interesting to trace what became of the gold coin minted in 1912, when the record total of £33,430,079 was struck by the Royal Mint in London. This is done in the chapter which deals with the movements of gold.

The loss owing to the abrasion of gold coin is considerable. The Royal Mint reported in 1915 that the loss to the State of actual gold, involved in exchanging full for light weight gold coin in the United Kingdom, since 16th March, 1892 (when an order in Council was issued for the withdrawal of light gold coins), amounted to £967,243. To arrive at the total loss the cost of re-coinage and the incidental expenses connected with withdrawal must be added as well as the loss borne by the public, owing to the deduction made by the Bank of England on crediting coin which proves to be of light weight.

Gold Coins Struck at the Royal Mint, London, from 1870–1917

Year.	*Number.*	*Value.*
1870–1895	138,063,445	£110,292,612
1896	6,280,670	4,807,368
1897	3,568,156	1,784,078
1898	7,229,874	5,795,610
1899	10,877,859	9,196,918
1900	15,154,113	13,000,427
1901	3,616,612	2,597,779
1902	9,062,971	7,126,194
1903	11,410,684	10,149,655
1904	11,758,809	10,900,089
1905	8,934,396	7,422,400
1906	14,712,418	12,589,700
1907	22,692,084	20,575,374
1908	15,725,998	13,727,502
1909	16,167,814	14,162,456
1910	27,403,505	24,891,564
1911	36,148,211	33,096,158
1912	36,542,237	33,430,079
1913	30,633,962	27,586,817
1914	18,752,241	15,126,679
1915	22,338,027	21,316,653
1916	1,554,120	1,554,120
1917	1,014,714	1,014,714
Total	469,642,920	£402,144,946

CHAPTER VII

THE MINTAGE OF THE WORLD

WHEN the subject of the world's coinage of gold is approached, we need to tread carefully, for, in the new era that will open after the conclusion of the Great War, we shall stand at a parting of the ways. Systems of political and financial economy will be modified, and many conditions that seemed vital to daily life in days past and gone, will disappear for good. Amongst these obsolete aids to civilized life, will, to some extent, at least, be gold coins, inasmuch as gold, until the world's stock has increased so as to correspond with the expansion of values, will, so far as its currency sphere, be devoted almost exclusively to the adjustment of international balances. In these circumstances, failing the introduction of an international coin, gold will mostly change hands as bullion, and will, therefore, be equally handy, coined or uncoined. It is safe, therefore, to assume that those countries which have hitherto been the greatest coiners of gold, will be so to a lesser extent.

This tendency began to take effect soon after the outbreak of war. The following two tables, compiled by the Director of the United States Mint, show the changes in the years 1913 and 1915

These tables are inserted in their entirety, so as to indicate the preference of countries respectively, as to the coinage of gold or of silver.

In the case of Great Britain, Australasia, and Canada, the amount of gold minted showed in 1915 a decrease respectively of 23 per cent., 82 per cent., and 100 per cent., as compared with 1913, the net reduction in value

1913

Country.	*Monetary Unit.*	*Unit Value of Country's Money.*	*Value in United States Money.*
United States	Dollar	25,433,377	$25,433,377
Philippine Islands	Peso	—	—
Abyssinia	Piaster	—	—
Austria-Hungary	Crown	18,183,203	3,683,916
Belgium	Franc	—	—
Brazil	Milreis	103,640	56,623
British Empire:			
Australasia	Pound	9,207,467	44,808,138
British East Africa and Uganda	Rupee	—	—
British West Africa	Pound	—	—
Canada	,,	—	—
,,	Dollar	1,986,480	1,986,480
Ceylon	Rupee	—	—
Great Britain	Pound	27,566,789	134,153,179
Kong Kong	Dollar	—	—
India	Rupee	—	—
Straits Settlements	Dollar	—	—
Other British Dependencies	Pound	408,181	1,986,412
Bulgaria	Leva	—	—
Chile	Peso	350,340	127,865
China	Tael, 1913.	—	—
,,	Dollar, 1914	—	—
Columbia	Dollar	—	—
Costa Rica	Colon	—	—
Denmark	Kronor	15,689,680	4,204,834
Dutch East Indies	Florin	—	—
Ecuador	Sucre	—	—
Egypt	Pound	—	—
Ethiopia	Talari	—	—
Finland	Markka	8,240,000	1,589,296
France	Franc	246,281,160	47,532,264
French Colonies:			
Indo-China	Piaster	—	—
Tunis	Franc	1,290	249
Germany	Mark	143,525,760	34,173,483
German East Africa	Rupee	—	—
Honduras	Peso	12,000	5,335
Italy	Lira	—	—

Country.	*Monetary Unit.*	*Unit Value of Country's Money.*	*Value in United States Money.*
Japan	Yen	17,870,000	$8,906,408
Mexico	Peso	—	—
Morocco	Rials	—	—
Netherlands	Florin	4,000,000	1,607,800
Nicaragua	Cordova	—	—
Norway	Crown	—	—
Persia	Kran	232,066	39,915
Peru	Libra	73,373	358,070
Portugal	Escudo	—	—
Rumania	Leu	—	—
Russia	Ruble	—	—
Salvador	Peso	—	—
Serbia	Dinar	—	—
Siam	Tical	—	—
Sweden	Crown	—	—
Switzerland	Franc	20,000,000	3,860,000
Turkey	Piaster	1,317,376	5,791,975
Venezuela	Bolivar	—	—
TOTAL			320,305,619

1915

Country.	*Monetary Unit.*	*Unit Value of Country's Money.*	*Value in United States Money.*
United States	Dollar	23,968,402	$23,968,402
Philippine Isalnds	Peso	—	—
Austria-Hungary	Crown	1,890,124	382,939
Brazil	Milreis	43,140	23,563
British Empire:			
Australia	Pound	1,700,671	8,276,315
British West Africa	,,	—	—
Honduras, British	Dollar	—	—
Canada	,,	—	—
Great Britain	Pound	21,316,653	103,737,492
India	Rupee	—	—
Bulgaria	Leva	—	—
Chile	Peso	1,305,720	475,588

Country.	*Monetary Unit.*	*Unit Value of Country's Money.*	*Value in United States Money.*
China	Dollar	—	—
Columbia	,,	—	—
Costa Rica	Colon	10,000	4,654
Cuba	Peso	5,618,000	5,618,000
Denmark	Kroner	10,649,040	2,853,943
Dutch East Indies	Florin	—	—
Ecuador	Sucre	—	—
Egypt	Pound	—	—
Ethiopia	Talari	—	—
France	Franc	—	—
French Colonies:			
Indo-China	Piaster	—	—
Tunis	Franc	1,290	249
Germany	Mark	25,361,100	6,041,014
Italy	Lira	—	—
Italian Somaliland	Rupee	—	—
Japan	Yen	30,260,000	15,084,610
Mexico	Peso	—	—
Morocco	Rials	—	—
Netherlands	Florin	—	—
Netherlands East Indies	,,	—	—
Norway	Crown	—	—
Panama	Balboa	—	—
Persia	Kran	1,394,212	109,027
Peru	Libra (£)	91,984	447,640
Portugal	Escudo	—	—
Russia	Ruble	—	—
Servia	Dinar	—	—
Siam	Tical	—	—
Sweden	Crown	—	—
Switzerland	Franc	19,000,000	3,667,000
Turkey	Piaster	300,229,650	13,210,105
TOTAL		442,939,986	183,901,541

with regard to all the British Commonwealth is about £14,000,000, a combined percentage of 38 per cent. of Germany's gold coinage diminished by 82 per cent. —or in sterling value £5,600,000. Austria-Hungary

diminished by 89 per cent. or £700,000. Now comes an unexpected change. Turkey's mintage rose 128 per cent., an increase of £1,500,000. Here we have evidence of the wages paid Turkey by her German master.

The upshot of the above indicates that the new gold supplies, which previous to the war would have been minted into coin, remained in the form of bullion, and, as will be seen in another chapter, went to swell the gold reserves of the United States, and those of neutral nations.

The comparative fewness of the nations which figure in the list as coining gold, is significant. In 1915 only fifteen (counting the whole of the British Commonwealth as one) are to be found—and of these, only six minted over a million sterling. If Turkey, appearing in the list by the exceptional circumstances attaching to that particular year alone, be eliminated, there remain only the following five countries, placed in order, according to the amount of coinage. The British Commonwealth, the United States of America, Japan, Germany, and Cuba. Of the grand total coined by the world in 1915, it will be noticed that the British Commonwealth, and the United States of America, are responsible for 75 per cent.

These facts suggest pregnant thoughts. The two latter countries produced in 1915 respectively 60 per cent. and 22 per cent. of the world's supplies of gold (together 82 per cent.) and minted in that year no less than 75 per cent. of the world's gold coinage. At the same time, the United States produced 44 per cent., and the British Commonwealth 20 per cent. (together 64 per cent.) of the world's silver output. These two countries producing practically three-quarters of the world's entire supplies of gold and silver, possess obviously powerful means to deal with the very serious

currency problems which will undoubtedly arise as the result of trade redistribution and the expansion of values, as a consequence of the Great War.

Appended will be found an estimate of the world's stock of gold currency on 31st December, 1913, taken from the United States Mint report—

Country.	Monetary standard.	Monetary unit.	In Banks and Public Treasuries. Thousands.	In Circulation. Thousands.	Total. Thousands.	Population. Thousands.
United States	Gold	Dollar	$1,524,100	$380,600	1,904,700	98,200
Austria-Hungary	,,	Crown	252,200	44,100	296,300	49,900
Belgium	,,	Franc	48,500	20,000	68,500	7,500
British Empire—						
Australia	,,	Pound Sterling	193,100	23,400	216,500	4,800
Canada	,,	Dollar	141,300	1,200	142,500	7,200
United Kingdom	,,	Pound Sterling	494,300	335,800	830,100	45,400
India	,,	,, ,, and Rupee	124,000	250,000	374,000	244,300
South Africa	,,	Pound Sterling	15,000	—	15,000	6,000
Straits Settlement	,,	Dollar	1,200	—	1,200	2,000
Chosen (Korea)	,,	Yen	1,700	—	1,700	13,500
Denmark	,,	Crown	40,500	—	40,500	2,800
Egypt	,,	Piastre	10,100	181,200	191,300	11,300
France	,,	Franc	682,800	517,200	1,200,000	39,600
Germany	,,	Mark	284,700	631,000	915,700	65,000
Greece	,,	Drachme	31,800	—	31,800	3,000
Haiti	,,	Gourde	400	1,500	1,900	2,000
Italy	,,	Lira	265,500	—	265,500	35,000
Netherlands	,,	Florin	60,900	—	60,900	6,000
Norway	,,	Crown	19,900	6,100	26,000	2,400
Rumania	,,	Lei	40,100	2,100	42,200	7,300
Russia	,,	Rouble	733,400	278,100	1,011,500	163,900
Serbia	,,	Dinar	12,000	—	12,000	2,900
Siam	,,	Tical	100	—	100	8,100
South American States—						
Argentina	,,	Peso	292,600	—	292,600	7,200
Bolivia	,,	Bolivino	8,000	—	8,000	2,300
Brazil	,,	Milreis	90,100	—	90,100	23,100
Ecuador	,,	Sucre	2,900	1,900	4,800	1,500
Guiana, British	,,	Pound Sterling	100	800	900	300
,, Dutch	,,	Florin	100	—	100	100
Paraguay	,,	Peso	1,700	—	1,700	800
Peru	,,	Sol	5,400	14,600	20,000	4,500
Uruguay	,,	Peso	14,800	—	14,800	1,200
Venezuela	,,	Bolivar	1,800	—	1,800	2,700
Spain	,,	Peseta	92,500	—	92,500	19,600
Sweden	,,	Crown	27,500	—	27,500	5,600
Switzerland	,,	Franc	32,800	—	32,800	3,700
Central Am'can States—						
Nicaragua	Silver	Peso	—	—	—	600
Salvador	,,	,,	2,000	—	2,000	1,200
TOTALS			5,549,900	2,698,600	8,239,500	902,500

CHAPTER VIII

THE GOLD STANDARD

THERE are many matters of vital importance to the safety and happiness of the individual concerning the working of which he is often in absolute ignorance, and to which he remains indifferent until an occasion arises when his safety or happiness becomes menaced, or perhaps adversely affected. Amongst these matters are comprised such diverse items as the manipulation of railway signals, the drainage system, the defence of the realm, the question of food supply, and the currency system of the country. The last mentioned has an ominously technical sound, and when, in reply to a tentative question, an inquirer is informed that it is based upon "the gold standard," he begins to realize that he is venturing upon unaccustomed paths, and is in urgent need of a guide, philosopher and friend. The present work affords an opportunity of dealing with this question in simple fashion, for, designed as it is to interest, and provide information to the general reader about gold, it can hardly avoid touching upon the way in which this metal governs the monetary affairs of the major part of mankind.

It is evidently desirable that all commodities should be measured by one and the same standard of value, and that this standard should, as far as possible, be one not liable to alter its relation to the whole body of commodities by the undue plentifulness of the material of which it is composed or otherwise. The word *undue* is used because the quantity of money required for the exchange of goods in a community

varies with the activity of trade, the size of the population, and the methods which may be taken to modify its use.

The greater part of the world has decided that gold is the material best fitted to fulfil these requirements. Its success in this capacity is not absolute, for the production of gold naturally does not expand or contract in correspondence with cycles of prosperity or of depression in the world's trade, nor can it be relied upon to increase in just relation to that of the world's population, nor can supplies be adjusted automatically to any reduction in its use caused by the adoption of other methods of payment. On the contrary, under the present system, the *search for gold continues*, whether additional supplies of the metal be needed for the world's currency requirements or not. The reason for this is, that the demand for gold is insatiable as long as free mints exist, for however much be mined, the output can always be turned into money, and applied to the purchase of desirable commodities.

A free mint is one which receives fine gold (or certain foreign gold coins at a figure based upon their fine gold contents), and gives out in exchange legal tender gold coins of the country concerned. Some countries make a small deduction, called seignorage, in order to cover expenses connected with mintage. This is not the case with the British Mint, for anyone has the power to send gold into the Royal Mint (situated in the vicinity of the Tower of London) or into any of its branches abroad, and to have it returned in the form of sovereigns without any deduction whatever, after due time has been allowed for the operation. In order, however, to avoid delay in providing the tender with currency, the Bank of England, acting as agent of the Royal Mint, is prepared to buy fine gold (or approved gold coins

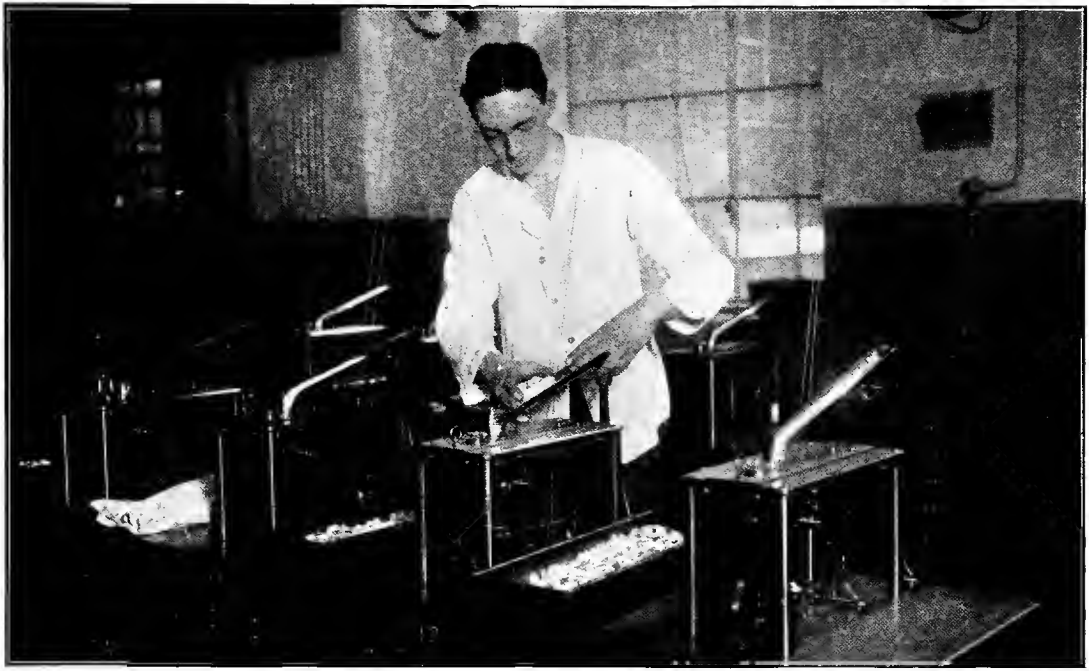

Photo by the *Press Photographic Agency*

WEIGHING ROOM, ROYAL MINT.

at a fixed rate). The Bank is always willing to purchase fine gold at a minimum of 77s 9d. per standard oz., namely, 1½d. less than 77s. 10½d. per standard oz., the basis upon which the Royal Mint itself would account for tendered gold. In other words, as each sovereign weighs about ·256 of an oz., the Bank of England charges the public about ⅜d. per sovereign, or about 1½ per mil. for the convenience of providing gold currency, so that it may not have to wait until the actual tendered metal has been coined by the Royal Mint.

Thus, in all countries enjoying a gold standard, the possessor of gold in any form can always obtain an equivalent in gold legal tender currency at a fixed rate in relation to the fine weight of the gold in his possession. The word "equivalent" is used in the paragraph because the function of a mint in some of the gold standard countries has become atrophied from lack of use—gold currency having ceased to be maintained in circulation. Nevertheless, often payments have to be made, either owing to custom or legal arrangement, in "gold" currency, and, when coin is non-existent, the debtor must either pay a premium for this nominal kind of currency, or he must import the gold.

India, which entered the ranks of Gold Standard Countries in 1893, when the British sovereign was declared legal tender in the proportion of one sovereign to fifteen rupees, now possesses a branch of the British Mint, for the purpose of producing gold coins, and has produced mohurs or 15 rupee pieces. It does not follow that the Indian Mint will find much to do in the way of gold coining. A quantity of gold, about two and a half millions sterling only in value, is produced in India each year. This gold used always to be shipped to

London, to be there realized. Out of the funds thus obtained, a sufficient proportion was remitted to India, in order to meet the expenses incurred in that country. Now that the proposed Indian gold mint has been set up, it is unlikely that the native gold will be shipped to England, but it is also improbable that the mining companies will send it into the Indian Mint as long as a better price is obtainable for it in India as a commodity, unless impelled to do so by Government desire. If fine gold be remitted to India from abroad, and sent into the Indian Mint for coinage, the mohurs or sovereigns minted therefrom, must be full weight when issued. Hence, legal tender sovereigns of light weight would be a cheaper remittance to India, than gold which would have to be turned into coins of full weight.

As a matter of fact India has little occasion for gold currency at present. The great mass of the Indian people are of small means—£6 a year is the minute income upon which millions of families have tó subsist. The impossibility of natives, who subsist upon so small a sum, having occasion to handle gold is self-evident. Large annual imports of sovereigns have been received by India, but by far the greater number have found their way speedily into the melting pot. In 1917, the Indian Government issued a proclamation forbidding the practice. In so populous and wide-spread a country, however, the custom will be difficult to stop. It may be taken, therefore, that the bulk of the gold remitted to India, will be utilized for manufacturing purposes, and only the surplus for currency; provided, of course, that the Indian Government itself does not continue to control gold imports, as it has done during the latter part of the Great War. So deep-seated is the affection of the Indian people for the precious metals as ornaments, that the greater the prosperity of the people,

the greater is their desire to import them for the purpose.

The preceding remarks imply that, in currency systems based upon a gold standard, a unit of money containing a certain defined quantity of fine gold is designated, but it does not follow necessarily either that there is occasion to mint the coin, or, if it be minted, that it circulates within the country of origin. Hence, something more than the mere existence of a gold standard coin is necessary to render gold an effective basis for currency.

To gain a proper view of the subject, the two-fold purpose of a currency system needs clearly to be apprehended, namely, its power to act as a medium of exchange for commodities within and without the country concerned. Provided confidence exists in the issuing authority, it is practically immaterial of what substance money be composed. Articles of the most varied character, feathers, dried fish, rum, etc., have been employed in this way, their usefulness being somewhat marred by their perishable character. In highly civilized communities, the tendency is for money to be expressed by a material practically of no intrinsic value at all, namely, paper, but possessing effective value as a lien upon the credit of the issuing authority.

It is of supreme importance, however, that a State should enjoy the confidence of its subjects as to one important detail, namely, that when they have occasion to discharge indebtedness incurred by them outside the State, the money in their hands—be it silver, copper, or paper—shall be exchangeable into currency considered good enough for their connections abroad, without loss to the present holders. Gold currency is almost universally thus accepted (subject to the exception of China alone). Hence the Government of

India (where silver rupees and gold sovereigns are both legal tender to any amount, at a ratio of 15 to 1) acknowledges an obligation to ensure that Indian merchants, when they have disposed of their imported goods, should be able to turn the rupees which they have received from their native customers, either into actual gold for export, or into a book credit abroad (based upon gold) at a cost of not *more* than 15 rupees for each sovereign. On the other hand, no obligation rests upon the Indian Government to ensure the converse, namely, that Indian merchants should not pay *less* than 15 rupees for the sovereign abroad, for, in the latter case, it is obvious that the holders of internal currency would then have the advantage of outsiders, seeing that their money would carry a premium.

As a general rule, however, it may be assumed that wide variations in currency exchanges between one country and another, even though they involve an appreciation of the currency of one of the two, are not really advantageous, inasmuch as they tend to restrict and hinder trade relations between the respective countries. The steadiness of its exchange with gold standard countries enjoyed by India since the cessation of free silver coinage, conduced remarkably to the advantage of India by eliminating speculative operations in exchange, by creating confidence that any capital introduced could be withdrawn without a loss arising from a depreciation in the value of the rupee, and also that dividends on Indian investments would not suffer from a like cause.

The last remarks apply to the commercial relations between countries generally, and demonstrate the advantages of one universal basis for currency. To some extent, the gold standard which now obtains throughout the major part of the world, fulfils this end.

But it should be remembered with regard to exchange that the mere possession of a gold standard can never make up for a balance of trade. Unless a country has the power to move the balance of trade when desired so as to be in its favour it will always find a difficulty in keeping up its foreign exchange. Exports and imports really decide the question, but the effect of adverse trade balances usually can be staved off temporarily by borrowing funds from abroad. This borrowing is limited naturally by the credit enjoyed by the debtor.

The normal rates at which the mints of the principal gold standard countries used to be prepared to purchase fine gold are given below, together with the par value of full weight standard gold coins of these countries expressed in British currency—

	Rate at which gold purchased by Mints.	*Denomination of Coin.*	*Value compared with British Sovereign.*
United States of America . .	$20·67183 per oz. fine	Eagle	£2 1s. 3d.
France . . .	3437 francs per kilo fine	Napoleon	15s. 10½d.
Holland . .	1648 florins per kilo fine	10-florin piece	16s. 8d.
Germany . .	2784 marks per kilo fine	20-mark piece	19s. 7d.
Austria . .	3274 kronen (after allowing for seigniorage) per kilo fine	20-kronen piece	16s. 8d.

CHAPTER IX

THE MOVEMENTS OF GOLD

A PORTION of the world's production, and some of the stock devoted to the purpose of currency, is constantly being moved from one part of the world to another—usually in payment for the balance of trade between the countries concerned. In order to illustrate the travels of the metal, figures relating to the imports and exports touching the United Kingdom during the year 1912 are appended. The tables deal respectively with gold minted into sovereigns, and gold in an uncoined condition—

SOVEREIGNS

Imports.	£	*Exports.*	£
British India .	1,930,000	Egypt . . .	8,330,000
Turkey . .	580,000	S. & Central American States . .	5,955,000
Australia . .	482,000	British India .	4,941,000
Germany . .	459,000	Turkey . .	2,060,000
Switzerland . .	105,000	France . . .	900,000
France . . .	78,000	Java and other Dutch Colonies	529,000
Other Countries .	606,000	Belgium . .	420,000
		Germany . .	409,000
		Russia . . .	175,000
		South Africa .	70,000
		Other Countries .	551,000
	£4,240,000		£24,340,000

Bar Gold

Imports.	£	*Exports.*	£
South Africa	40,076,000	British India	8,104,000
British India	2,169,000	Germany	2,870,000
West Africa	1,538,000	United States of America	1,904,000
S. & Central American States	1,106,000	Turkey	1,021,000
Austria-Hungary	700,000	Holland	998,000
Australia	495,000	Switzerland	730,000
Java, etc.	408,000	France	707,000
New Zealand	222,000	Russia	480,000
Other Countries	358,000	Other Countries	1,018,000
	£47,135,000		£17,832,000

It will be observed that the net export of sovereigns during this particular year was about £20,100,000, so that, as the British gold coin issued by the London Mint was £33,430,079 (as recorded elsewhere), a sum of about £13,250,000 must have been added in this one year to the stock of British gold coin in the United Kingdom. From the second table it will be seen that about £29,300,000 of uncoined gold was imported on balance. Allowing for the export of about £3,600,000 of foreign gold coin which occurred in that year, the gain of gold to this country in 1912 would appear to be £5,600,000. The net gain was really much more than this total, because a large amount of gold is introduced annually by visitors, and most of it is spent within this country.

The country which has absorbed by far the greatest proportion of gold during recent years, has been India, where a remarkable degree of prosperity had been

attained. The figures in the preceding tables show a net gold export to India of £8,946,000; this represents about 21 per cent. of the total exports from this country during the year in question, but the British figures do not represent by any means the total amount received by India, as it obtained gold from elsewhere. The fact is significant of the success with which Great Britain administers its Dependencies; native industries prosper to such an extent that the balance of trade moves heavily in their favour—notwithstanding that large amounts (in the case of India, some £20,000,000) have to be remitted annually to London in order to defray the cost of loans and administration.

Indian imports and exports of gold over a series of years are given on page 86.

Again referring to British exports of bullion in 1912, it will be observed that Egypt, another Dependency of this country, drew no less a sum than £8,330,000 in sovereigns from the United Kingdom. It is legitimate cause for pride that the association of British authority with Egypt has rescued that country from the verge of bankruptcy, and its people from the position of State Slaves to that of Freemen. Not only did Egypt draw this handsome sum of over eight million sterling in settlement of its favourable trade balance, but the internal conditions of the country have been immensely improved, forced labour has been abolished, and taxation reduced to modest proportions. Moreover, the acreage available for agriculture has been increased substantially as a result of great schemes of irrigation, the setting up of which never cost Egypt a fraction of a piastre, owing to the sales of land thus put into cultivation. In other words, gold statistics justify in unchallengeable fashion, the supervision which Great Britain has exercised over the fortunes of the Egyptian

people. The determination of this Empire—however much it falls short of attaining its ideal, and often hindered by nations jealous of its successful handling

NET IMPORTS OF GOLD COIN AND BULLION INTO INDIA

	Value in Rupees.		*Net Imports of Gold (in Ounces).*
Avr. 1893–94	1,62,67,000	1893–94	96,236
Avr. 1894–95	1,62,67,000	1894–1895	689,970
1895–96	2,52,60,000	1895–96	322,623
1896–97	2,29,11,000	1896–97	309,365
1897–98	4,90,85,000	1897–98	732,035
1898–99	6,50,34,000	1898–99	1,022,000
1899–1900	9,44,06,000	1899–1900	1,560,812
1900–01	84,21,000	1900–01	106,678
1901–02	1,93,76,000	1901–02	274,506
1902–03	8,76,46,000	1902–03	1,416,618
1903–04	9,93,17,000	1903–04	1,566,237
1904–05	9,70,59,000	1904–05	1,516,992
1905–06	45,80,000	1905–06	65,472
1906–07	14,85,61,000	1906–07	2,377,151
1907–08	17,36,77,000	1907–08	2,781,340
1908–09	4,35,54,000	1908–09	625,338
1909–10	21,67,95,000	1909–10	3,505,136
1910–11	23,97,86,000	1910–11	3,843,422
1911–12	37,75,98,000	1911–12	6,224,026
1912–13	34,00,12,000	1912–13	5,562,000
1913–14	23,32,38,000	1913–14	3,749,000
1914–15	7,64,74,000	1914–15	1,178,000
	245,53,24,000		39,524,957

of less developed races—is to maintain the position of trustee, and not owner, of the lands over which it holds control.

In the case of many countries (particularly so in that of Egypt) imports of gold are seasonal, that is to

say, the gold is required for the financing of crops, amongst which may be enumerated the wheat and jute crops in India, the cotton crop in Egypt, the wool crop in Australia, and that of wheat in the Argentine. Sometimes the gold flows back, or into a fresh channel, the same or the following year. But, as a rule, much of the gold imported into a country has a tendency to take up permanent residence, either because the increase of population or of internal trade demands additional currency, or because the native inhabitants not yet habituated to the advantages of banking, make a practice of hoarding their profits in actual bullion or specie.

This practice used to be very prevalent in France, prior to the Franco-German War of 1870. The thrifty housewives who controlled the budget of the French peasant or workman, used to provide a " long stocking " to which they confided their savings, mostly wrung with painful care from a moderate income. Rentes and other interest-bearing securities now largely take the place of the gold which formerly used to be hoarded. Some countries have not yet reached that stage of development when a certificate of value bearing interest coupons supplant buried metal as a reserve against a " rainy day." These folk still consider that the ideal methods to deal with a *talent* is to bury it, rather than to loan it out on usury. One reason for their hesitation is, that their native land has not yet possessed tranquillity for sufficient generations to drive away the feeling that it is wise to have wealth handy and portable in case of sudden alarums and excursions, or of the change of dynasty, which often can come about with alarming rapidity. Such a state of mind still exists to some extent in West Africa, Upper Egypt, and the Soudan, but principally amongst the dwellers in the

fertile Indian plains between the rivers, and in the debilitating southern regions where the natives are disposed to work, but are little inclined to fight. In the years prior to the Pax Britannica, generation after generation of these quiet folk had been exposed to irruptions of fierce alien hordes who emerged from the northern passes of India, impelled by the hope of laying forcible hands upon the portable results of other people's toil. What could be more natural, than that these poor folk (the great bulk of the Indian people, judged by Western nations, are exceedingly poor), should keep their surplus earnings in such a form that, in case of sudden alarm, concealment could easily be effected? Nor had they only cause to fear invasion. Ruling Princes under an autocratic régime have a tendency to cast an evil eye upon the prosperous and wealthy. Therefore, in the case of a populous country, like India, addicted to the hoarding habit, no one need feel surprised at the prodigious net import of gold, to which attention has been drawn.

Movements of gold for the purpose of discharging international indebtedness would have been larger and more constant had not London been used as the world's financial clearing house. It has been found of the utmost convenience for foreign Governments and for international banks to maintain in London large cash balances. The existence of these serves to sustain the credit of the countries and institutions concerned, and also enables an immediate transfer of cash, that otherwise might have had to be effected by the comparatively slow and cumbrous method of a gold shipment, to be made from the credit of one country to that of another.

Although prior to the War, the great joint-stock banks held considerable stocks of gold in their vaults,

details of which are to be found in the chapter dealing with stocks of gold, the usual practice, when gold was required for shipment abroad and the supplies in the open market were absorbed, used to be that gold was specially withdrawn from the Bank of England by presentation of an open cheque upon that institution. This entitled the presenter to receive payment in cash, that is to say, in notes or gold. Inasmuch as notes could be presented at once for encashment in gold, the presenter would naturally ask in the first instance to be paid in gold, that is in sovereigns, should he desire to make a remittance abroad.

This he would not always do for this reason. In some foreign countries, as well as in British territory, a sovereign circulates at face value, provided it be of legal tender weight, but, to the rest of the world, it represents nearly so much weight of gold, eleven-twelths fine. Therefore in many instances, the question as to how much the average weight of the sovereigns available is below their mint weight, is of considerable importance to the exporter. The Bank of England is bound to cash its notes in gold currency, but is not bound to do so in coins of a greater weight than the limit laid down by law, namely, 122·5 grains each, that is to say, about $6\frac{1}{4}$ per mille below 123·27447 grains which constitute the full Mint weight of a sovereign. Hence, before exporting gold, it is necessary to consider whether the purchase of refined gold bullion from the Bank of England (failing any disposable in the open market), would be more favourable than withdrawing sovereigns. It usually is, and, for this reason, the Bank holds a stock of bar gold (whence the Royal Mint is supplied as required), and is, generally prepared to dispose of it at a figure slightly below the bullion value of sovereigns likely to be given out for export. The Bank has also, as a rule, usually a

stock of foreign gold coin, which it is prepared to sell at a specified price as bullion.

The weight of 100,000 sovereigns of full weight is 25,682·2 oz., and of the same quantity of lowest legal tender weight 25,520·8 oz., but the average weight of a parcel withdrawn from the Bank of England is rarely less than 25,620 oz. Based upon these figures the cost of acquiring full weight sovereigns as bullion is equal to 77s. 10½d., the standard oz., compared with about 78s. 0¾d. in the case of medium weight coin (25,620 oz. per thousand pieces). The Bank of England is usually willing to sell refined gold at about 78s. the standard oz.; if, therefore, gold is required as a remittance to a gold standard country, where sovereigns do not possess legal currency, refined gold is preferred to sovereigns for shipment.

The cost of moving gold is normally very slight compared with its value. The operation is so systematized and carefully handled that losses seldom occur. Before the Great War the expense of transferring gold from London to Paris was less than 1 per mille, insurance included. By combining shipping and parcel post, gold used to be carried to most portions of the Continent at rates only slightly higher. No parcel post exists in the United Kingdom for bullion of a higher value than £5.

The future holds great changes as to the movements of gold. Transfers will be probably much less in number, and aeroplanes or airships may be employed when speed is desirable.

CHAPTER X

STOCKS

STOCKS of gold are spread throughout the world, mainly in proportion to the density and the wealth of the population, but not absolutely so, because a preference is shown by some countries for this metal over other materials, either as currency or as a means of holding wealth in reserve.

Stocks fall under two technical categories, visible and invisible. The former may be ranged under three heads, reserves against notes, bank reserves (tills, etc.), and war reserves.

The State Banks of Europe held the following amounts of gold toward the close of the years specified—

	1912.	1913.
Great Britain . .	£29,294,455	£33,874,535
Austria-Hungary .	50,380,000	51,666,000
Belgium . . .	8,559,000	9,960,000
Denmark [1] . .	4,305,000	4,260,000
France . . .	128,293,000	140,696,000
Germany . . .	38,504,000	59,887,000
Holland . . .	13,390,000	12,624,000
Italy [1] . . .	46,019,000	48,585,000
Norway . . .	2,353,000	2,657,000
Russia . . .	155,841,000	168,355,000
Spain . . .	17,485,000	19,168,000
Sweden . . .	5,563,000	5,672,000
Switzerland . .	7,092,000	6,813,000

Great changes took place during the Great War as shown by the following figures, taken toward the close of the respective years—

	1914.	1915.	1916.
Great Britain	£69,032,135	£51,338,430	£52,840,165
Austria-Hungary	51,578,000	none issued.	none issued.
Belgium	10,977,000	,, ,,	,, ,,
Denmark[1]	4,520,000	5,930,000	8,076,000
France	165,670,000	200,611,000	203,037,000
Germany	104,274,000	122,066,000	125,954,000
Holland	17,332,000	33,655,000	49,210,000
Italy[1]	49,628,000	53,661,000	43,036,000
Norway	2,246,000	3,644,000	6,838,000
Russia	176,796,000	160,726,000	146,684,000
Spain	22,870,000	34,490,000	49,154,000
Sweden	5,809,000	6,594,000	10,152,000
Switzerland	9,510,000	9,953,000	12,821,000

[1]It is possible that the figures set against these two banks include some portion of silver.

In addition to the Bank of England reserve against notes already dealt with, certain Scotch and Irish Banks hold reserves against their notes, the issue of which is not on a large scale.

The Treasury of the United States of America held gold as follows at the close of 1913 and 1916 respectively.

	Dec. 31st, 1913.	*Dec. 31st*, 1916.
Gold Bullion	$303,585,254	$1,294,802,847
Gold Coin	$987,678,101	$906,491,238
	$1,291,263,355	$2,201,294,055

Further light is thrown upon the holdings of gold in the United States of America, by the following extract

from Samuel Montagu & Co's. bullion letter of the 26th September, 1918—

"From 1st August, 1914, to 14th June, 1918, the following movements of gold took place with regard to the United States of America.

Imports.	*Exports.*	*Net Imports.*
$1,750,484,000	$684,406,000	$1,066,078,000

"During this period the world's production was about £360,000,000, net consignments to the United States were, therefore, equal to about 60 per cent. of this amount.

"Statistics as to the holdings of gold resources, by the Twelve Federal Banks in the United States of America show where a large portion of the above mentioned important gold imports found a resting place. The official return, dated 7th July, 1918, thus compares the position of these banks in respect to gold—

On July 5th, 1918	$1,959,110,000
On July 6th, 1917	$1,317,703,000

"It will be observed that between these two dates the gold resources of these banks had increased by nearly 50 per cent. This is interesting but in the circumstances not surprising."

Since the Federal Reserve Banks system was instituted a remarkable increase has taken place in gold holding—

Resources.	*September 13th,* 1918.	*January 12th,* 1917.
Gold Coin and Certificates in Vault	$386,214,000	$292,829,000
Gold Settlement Fund—F.R. Board	465,298,000	206,541,000
Gold with Foreign Agencies . .	5,829,000	—
TOTAL Gold held by Banks .	857,341,000	499,370,000
Gold with Federal Reserve Agents	1,123,132,000	274,512,000
Gold Redemption Fund . .	44,086,000	1,782,000
TOTAL Gold Reserves . .	$2,024,559,000	$775,664,000

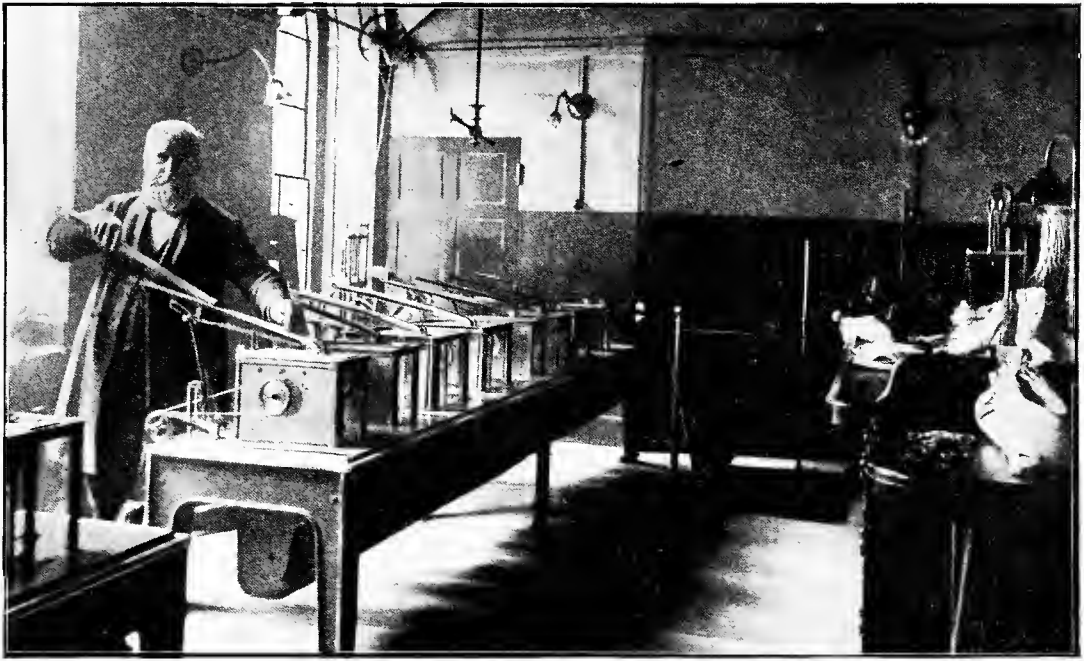

Photo by *Photo Press Agency*

TESTING THE SOVEREIGNS—BANK OF ENGLAND

The following is taken from *Financial America*, under date of 7th August, 1917—

" The total gold stock of the world is approximately $8,000,000,000. The United States, therefore, has in its possession to-day more than three-eighths of all the gold in the world. Eight billion dollars in gold, if assembled in one spot, would not occupy much space. Cast in one block it would make a cube of less than 36 ft."

A further substantial holding of gold is that by the Argentine Caisse de Conversion, the object of which is to maintain the stability of the exchange value of its currency.

The total rose from £46,700,000 in 1913, to £63,300,000 in 1916. The latter item includes gold in the Argentine legations abroad.

The annual bullion letter of Samuel Montagu & Co. for 1916, contains details as to the visible stock within the British territory according to the latest returns toward the close of that year—

Bank of England, against notes . .	£52,840,000
Treasury Note Reserve	28,500,000
Commonwealth Bank, against notes .	15,057,000
New Zealand Banks, cash and reserve against notes	7,400,000
Canadian Central Note Reserve . .	1,440,000
Dominion Government, as reserve against note issue and Savings Bank deposits .	23,800,000
Held by Chartered Banks of Canada .	13,000,000
National Bank of Egypt, against notes .	6,295,000
Indian Note Reserves—in India . .	7,893,000
,, ,, ,, in London . .	7,947,000
Straits Settlement Note Guarantee Fund	773,000
TOTAL	£164,945,000

It has been the custom of the Great Joint Stock Banks to hold a stock of gold in their vaults. Of late

years the tendency on their part has been to increase the amount individually held.

The following was the amount of Imperial gold coin held by the banks of the United Kingdom, including the Bank of England, on the last week-day in June of each year from 1909 to 1915. These figures do not include gold held as reserve against notes—

Year.	*Day of the Week.*	*Amount.*
1909	Wednesday	£49,221,074
1910	Thursday	44,214,173
1911	Friday	54,009,977
1912	Saturday	60'640,681
1913	Monday	69,524,127
1914	Tuesday	82,794,963
1915	Wednesday	110,188,109

Finally, in dealing with visible stock, mention must be made of the War reserve which was deposited by the German Government after the Franco-German War in the Julius Tower at Spandau. The amount was £6,000,000, and formed part of the indemnity obtained from France. One of the earliest indications of the strain caused by the war upon the gold resources of Germany was the reception from neutral countries of quantities of British sovereigns dated 1872 or 1873, in nearly mint condition, with the obsolete shield design on the reverse. These, undoubtedly, formed part of the gold treasure at Spandau, and it is remarkable that the German Government should have allowed them to find their way back to this country.

When we pass from visible to invisible stock we move from definite and ascertained figures to the realm of reasonable deduction, and even of speculation. One thing can be taken as certain, namely, that the former

description of stocks are far less in amount than the latter.

Invisible stocks may be taken to fall under the following heads—

(*a*) Gold actually current in various countries.
(*b*) Gold passing from one country to another.
(*c*) Hoards.
(*d*) Jewellery and plate.
(*e*) Gold in process of refining and melting.

In a sense gold forming part of chemical and other preparations forms part of the stock, because the actual proportion of gold is ascertainable, and recoverable, but such can hardly be included, because as a matter of fact almost the whole of the gold parts for ever with a chance of separate existence when it is incorporated in chloride of gold or similar commodities. Neither should unmined gold be included in stocks, even though some calculation can be made as to the gold reserves of mines in the Rand, for instance.

In the chapter upon the world's coinage will be found a table showing an estimate by the Director of the United States Mint of the approximate stock of gold money in the principal countries of the world on 31st December, 1913.

(*a*) The amount of gold coin which actually circulates varies considerably in different countries, and even districts of one country. It is governed by the standard of wealth and also by custom, especially amongst the working classes of the vast and populous Eastern countries. India, China and Japan, whose average earnings are perhaps less than a twelfth of those obtained by similar classes of Great Britain, require for their daily transactions units of exchange correspondingly small, and therefore silver and copper coins, not gold, are used to perform the necessary functions. There is

an exception in the case of the Punjaub in India, where, after the wheat harvest, sovereigns circulate awhile. Doubtless the reason is that small peasant proprietors find it convenient to receive payment for the lump sums with which they have to deal at this their great profit taking, in a form easy to carry, easy to cash, and easy to stow away until again required.

The same principle applies to the rest of the world. Notwithstanding that the standard of currency in a country is gold, coins of that metal may be rarely seen in actual use as money. Stocks may be held in the State Bank, in a less degree in the tills of ordinary banks, and in a still less degree in the permanent possession of the people, but payments may be made in notes or silver. To such an extent was this the case in Norway that a traveller humorously narrated that when he tendered a gold coin in discharge of his hotel bill the amazed recipient blew a trumpet in the market place, and invited his neighbours to view so remarkable a curiosity.

That the question is not one of wealth only is proven by the practice of the United States of America, where, throughout the major part of the country, notes fufil practically all the functions of currency, notwithstanding the high prices which prevail. In the neighbourhood of the Pacific Coast, especially at San Francisco, gold coins are more in evidence—probably as a survival of the discoveries of gold in that region. There, as in other parts of the United States, custom evidently has an important say in the matter.

Great Britain and France have always kept much gold in circulation, but it is highly probable that the convenience and economy experienced by the institution of Treasury currency notes of 20s. and under in value, will cause these handy substitutes for wasteful and weighty coins to be perpetuated. Country

folk in Great Britain may eventually be as much surprised at the sight of a golden coin as the inhabitants in the interior of Norway. It is estimated that prior to the Great War, the amount of gold coin circulating in Great Britain was about £75,000,000.

(*b*) In normal times a certain amount of gold is always passing from place to place, and only a small proportion is represented in the returns of banking institutions.

Scotch and Irish banks, as well as English, have constant consignments passing between their head offices, or the Bank of England, and their branches. Private firms as well as individuals have also parcels in transit though to a lesser extent. The major part, however, of gold which is travelling is on the sea, chiefly between Great Britain and its Oversea Dominions. Nor must it be forgotten that the 60 per cent. of the world's production which is mined in British territory has nearly always been brought to London. It is impossible to give an accurate idea of the extent of the gold in transit at any given moment, as the amount varies with seasons, and owing to special requirements. The total may vary in value from a million to a score of millions sterling.

(*c*) The amount of gold hoarded is enormous. There is a class of people, even in the most up-to-date communities, which cannot rid themselves of the hoarding habit. It is a survival of ancient days, when civil life was exceedingly insecure, and, as a custom, is akin to the preliminary circular sweep made by a dog before lying down to sleep on a mat, a motion similar to that of his prehistoric ancestors when they had to smooth down the grass to make an easy resting place.

Not infrequently Police Court proceedings mention thefts of gold which had been kept either in a teapot, on a shelf, underneath the bed, or in a cupboard.

During recent activities upon allotment grounds, finds have been made of secreted gold, and many more hoards lost or forgotten still await the light. Readers of *Pepys* will recall the stock of gold which he sent to his father's place for security, and how the old gentleman, to Pepys's great distress, forgot the exact spot in the garden where he had deposited it.

The daily newspapers frequently record sums amounting to hundreds of golden sovereigns, which have been presented in applying for War Loan, at the "Tanks" or elsewhere. All these straws, as it were, combine to show how considerable a quantity of gold has been accumulated in private store places.

It is impossible to obtain much assistance from statistics of gold imports and exports in estimating the invisible stocks within the United Kingdom, because a really large quantity of gold is carried in and out of the country by visitors and passengers as they journey to and fro. Some light upon the subject may be gained from data relating to India, where hoarding is cultivated to the extent of a fine art. Official figures are appended—

The Indian Government publish the following statistics regarding the entry and exit of gold during the half-century ending with the financial year 1913–14—

Quinquennial Average.	*Imports.*	*Exports.*	*Net Imports.*
1864–65 to 1868–69	£6,038,000	£314,000	£5,724,000
1869–70 to 1873–74	3,107,000	179,000	2,928,000
1874–75 to 1878–79	1,482,000	888,000	594,000
1878–79 to 1883–84	3,477,000	83,000	2,394,000
1884–85 to 1888–89	2,537,000	239,000	2,298,000
1889–90 to 1893–94	2,936,000	1,374,000	1,562,000
1894–95 to 1898–99	3,404,000	1,894,000	1,510,000
1899–1900 to 1903–04	8,666,000	4,544,000	4,122,000
1904–05 to 1908–09	11,233,000	5,002,000	6,231,000
1909–10 to 1913–14	21,858,000	3,092,000	18,766,000

Thus, the net amount retained within India during these fifty years reached the large aggregate of £235,645,000. As the production of the world during the fifty calendar years ending 1913 amounted to £2,125,750,000, India alone must have absorbed over 11 per cent. of the total.

(*d*) The amount of gold represented by jewellery is probably much larger than that hoarded in the form of coin or bullion. It is obviously impracticable to gauge the quantity, because the wear and tear of such articles is considerable, and great loss of material ensues from this cause. A great deal of so-called gold jewellery is merely gilt, or overlaid base metal, the gold of which is speedily dissipated by use. Much of the ceremonial plate commonly called gold is also gilt, and, if well treated, is hardly distinguishable in appearance from solid gold. The costliness of gold prevents any considerable use of gold for plate, but cups for races, such as the Ascot cup, are sometimes made of this metal. Quite a substantial amount of gold must be in existence, made up in the form of medals.

(*e*) Finally a certain quantity of gold is in the process of extraction from ore, and in the course of manufacture. Both industries deal with substantial amounts. The former may be occupied with ten millions sterling at a time, but no useful estimate can be made with regard to the latter.

The stock of gold and silver in 1810 is said by Delmar to have been £380,000,000, and in 1880 £600,000,000. Since that date, about £3,200,000,000 worth of these metals has been produced. It is a fair estimate to place the present world stock of precious metals at £3,750,000,000, of which, taking into account the lesser destructibility of the more precious metal, etc., perhaps £2,700,000,000 may be reckoned as consisting of gold.

The output of the world from 1493 to 1880 is given by the United States Mint as about £2,500,000,000 of both metals. Delmar considers the stock in 1880 to have been £600,000,000 of both metals. If we assume that £500,000,000 of the latter was gold, there has been a reduction of £2,000,000,000 in 387 years, or a wastage of under 77 per cent. This is equal to about ·2 per cent. per annum, say £5,000,000 a year. The average output between 1873 and 1914, as shown by the United States Mint, was about £46,000,000, so that, after deduction of wastage, the net annual average addition to the world's stock during this period was about £41,000,000. Allowing for the increase in the world's wealth per head, and for the annual increase of population (say 1¼ per cent.), this annual addition to the huge stock of gold in existence appears too small in proportion to cause any marked effect upon either the production or the value of the metal, as compared with other commodities.

CHAPTER XI

INDUSTRIAL USE

THE use of gold for ornament is of great antiquity, so great indeed, that experts in such matters have found a difficulty even in assigning approximate dates, and have classified the most ancient relics of the past within an elastic period, styled the Bronze Age. The soil of Ireland has been prolific in discoveries of buried gold treasure. Many centuries before Christ, there was an active intercourse across the narrow seas eastward, and it is said that the abundance of gold then existing in Ireland facilitated foreign trade, possibly in exchange for amber. The British Museum has a rich collection of early Irish gold ornaments, many of which are crescent-shaped collars, largely peculiar to this island. Places where similar articles have been found—France and Denmark—seem to have owed the introduction of this style of ornament to their proximity by sea. Armlets with open ends, clasps for the dress, bracelets bearing appendages called "ring money," have also been discovered in Ireland, where also bronze discs have been found, overlaid with gold—doubtless used for ceremonial purposes. These are taken to indicate that sun-worship was cultivated.

In Flintshire, a horse breastplate was recovered from a cairn called Bryn-yr Ellyllon (Hill of the Fairies or Goblins), near the river Alun at Mold. The basis was copper. It was coated with gold, and once had amber beads hung round like a fringe. The size of the remnant is $8\frac{1}{2}$ in. by about 3 ft. 7 in. This object is significant testimony to the amount of gold that then abounded,

Amongst the other articles discovered in England are spearheads, and a bowman's wrist-guard, both ornamented with gold studs. Gold armlets have been found near Eastbourne and in the county of Durham. Gold earrings were among the prized possessions deposited in one barrow, where a lady, evidently of high rank, had been laid to rest.

A short sword was recovered in Scandinavia, having gold plates attached to the edges of the grip. At a level of excavation at Hissarlik, attributed to about 2500–1500 B.C., bronze weapons have been found alongside gold vessels and beakers, and jewellery in variety, such as earrings, pins, and bangles. On the site of the lake dwellings in Switzerland, gold relics are rare, but small objects, such as beads, ear and fringe rings have been found.

The Iron Age introduced a wider range of fashion and design with regard to gold objects. The adoption of woven material for clothing instead of skins, led to the invention of brooches, which became necessary to fasten the garment which draped the person. Ingenuity was immediately applied to combine utility with ornament, and, naturally, the pliability and beauty of gold made it a favourite material for the composition of such jewellery. An abundance of torcs have been found of bronze, but many also of gold. These objects were formed of twisted metal, and were the national emblem of the Celtic peoples. The "Dying Gaul" in the Capitol of Rome bears one around his neck. In the year 361 B.C. Titus Manlius slew a gigantic Gaul, and having placed the collar of his fallen foe around his own neck, received the surname of Torquatus. Discs, helmet pieces, and similar objects belonging to this period bear designs of beasts and flowers, often very conventional in treatment.

On the whole, the quantity of gold ornaments discovered belonging to the Iron Age does not suggest that supplies of this metal had much increased during the period. The Marne district, now distinguished as the locality in which was waged two of the most decisive battles of the world, seems to have been the site for many chariot burials. No less than thirty-five tombs were found complete when opened, and many more had been previously rifled of their gold contents by Frankish invaders. The treasure consisted of brooches, rings, and torcs. A fine specimen of the last mentioned was also unearthed at Clevedon in Somersetshire.

It is not practicable to trace within the scope of this work the application of gold for industrial purposes during the succeeding centuries. For many years the chief and almost the only use was for jewellery, but a certain amount was applied at different epochs to the construction of utensils—notably for the service of religion. For instance, we read in Exodus iii. 22, that the Hebrew womenfolk in departing from Egypt were to "borrow" from their neighbours "Jewels of silver and jewels of gold," and in so doing to "spoil the Egyptians," and we find in Exodus xxxv. 22, that "they came, both men and women, as many as were willing-hearted, and brought bracelets and earrings, and rings and tablets, all jewels of gold: and every man that offered, offered an offering unto the Lord." We learn, too, the purposes to which the gold was required, namely, to provide rings of gold for the Ark, the overlaying of staves, images of cherubim, taches for the curtains of the Tabernacle, hooks for the pillars, the altar of incense, candlestick, dishes, basins, spoons and other vessels of the sanctuary. Later on we read that the erection of the Temple by Solomon was accompanied by a display of gold in still greater profusion.

The very walls of the Holy of Holies were overlaid with gold, and accessories such as lamps, tongs, hinges, and flesh hooks were formed of the same precious material.

Nor was this display confined to the Temple, Solomon's throne was covered with gold, and doubtless also the twelve lions which graced the six steps by which it was approached. When we conjure up the picture presented to Queen Sheba, as she approached the throne, flanked by soldiery, bearing "two hundred targets of beaten gold: six hundred shekels of gold went to one target," and "three hundred shields of beaten gold: three pounds of gold went to one shield," no wonder her heart sank within her, though she came from a land, the soil of which abounded with this precious commodity, and brought "very much with her in her caravan."

In 2 Kings, xvii., we find a dispersal of much of this last mentioned treasure, and a sidelight is thrown in the sixteenth verse, upon the extraordinary extent to which the display of gold had been carried. "At that time did Hezekiah cut off the gold from the *doors* of the Temple of the Lord."

In order to know the sacred value of gold the ancient Egyptians represented it by a circle with a dot in the centre. This circle was the symbol of divinity and perfection.

The proportion of the gold output applied to the Arts is a matter of conjecture. The earliest period concerning which an estimate can be deduced with any hope of accuracy, is that dating from the discovery of America. Delmar considers that up to 1878 the amount supplied to Europe since that date—1492—was £2,627,800,000, and that £33,400,000 in specie already existed in this Continent, making a total of £2,661,200,000. Estimating the amount of coin in

Europe to have been £700,000,000 in 1876, he reckons that about £2,000,000,000 remained which must either have been exported to the East, or absorbed by the Arts. Inasmuch as the amount exported to the East (about £600,000,000 net) was mostly used for manufacture, we can assume that a sum approximating two thousand millions sterling represents the industrial use of gold during the period mentioned.

Delmar gives in this connection the following table in millions sterling—

Date.	*Cumulative Supplies.*	*Stock.*	*Cumulative Consumption.*	*Percentage of consumption to Supplies.*
1675	509	250	259	50
1700	592	297	295	50
1776	1054	275	779	74
1808	1314	380	935	71
1828	1441	313	1128	78
1838	1510	270	1240	82
1850	1675	400	1275	76
1860	2040	560	1480	72
1870	2365	720	1645	70
1876	2564	740	1824	71

Since this date the production of gold has increased enormously. The gross amount produced since 1876 is probably not far short of £2,210,000,000. The stock of gold for currency, as at December 31st, 1915, is estimated by the Director of the United States Mint at £1,705,000,000. If we deduct from this Delmar's estimate of the stock of gold currency in 1876, namely, £700,000,000 and, say £80,000,000 as the addition during 1916 and 1917, purposely calculated larger in proportion—owing to the war—we obtain an amount of £925,000,000 as that absorbed by the Arts in the 51 years since 1876.

During recent years the United States Mint report provides details as to the industrial consumption of gold in certain countries; namely—

1914.

Austria	$552,444
Hungary	1,388,620
Sweden	498,450

1915.

United States	$35,376,739	China—	
Argentina	506,687	Foochow	$278,950
		Nanking	6,220,650
Australia—		Mukden	192,744
Victoria	905,740	Great Britain	16,708,006
Brazil	23,394	Portugal	1,639,653
Canada	2,140,000	Netherlands	719,783

1916.

United States	$51,061,187	China	$846,928
Australia—		Netherlands	974,336
Melbourne	448,015	Sweden	14,856
British Guiana	500	Taiwan (Japan)	27,776
Canada	2,304,910	Tunis	257,848

These figures are obtained from the Governments of the respective countries, but the difficulty of arriving at an estimate is so great that neither can such estimates be considered at all reliable, nor is it possible to build up a complete world return. The figures, just given, seem to indicate widely different methods of reporting. It is hardly likely, for instance, that Austria should only use one twenty-eighth part of the total used by Hungary. Again, the total given for China in 1916 is obviously only partial, for in 1915 three provinces alone of that country are shown to have used up eight times the quantity.

The great demand for gold during the Great War, in order to make foreign payments, has reduced to a minimum the amount applied to industrial purposes,

and has also led to a substantial reduction in the stock of jewellery, particularly in Germany and Austria.

The scarcity of the metal until quite recent times limited the use of gold for such a luxurious purpose as that of plate, whilst the vicissitudes to which nations have ever been subject, and the attractiveness of such articles as booty combined to give them a short life. Moreover, the need of money for State necessities led constantly to golden utensils being placed in the melting pot. An illustration of the disappearance of treasure, owing to national disaster, occurred at the time of the acquisition of Peru by Spain. It is thus recorded in the *Geographical Journal*, of October, 1917—

"The Rio Verde is locally reputed to have its source in the lake in the Llanganati Mountains, at the bottom of which the golden vessels which formed the ransom of King Atahualpa were thrown by the Incas when news reached Quito that their ruler had been murdered."

In the paper by Richard Spruce read before this society in 1860, and published in the proceedings R.G.S., 1861, p. 163, the story of the Inca treasure in the Llanganati is told at length.

A short *résumé* of the story is as follows: The contents of "the chamber filled with gold," stored in Quito for the ransom of the King from the Spaniards, was carried swiftly into the Eastern Andes by Inca runners when the messengers announced the murder of the ruler. A river which flows through a valley among these mountains was dammed, and the gold thrown into the artificial lake so formed. A Spaniard, Valverde by name, who many years afterwards married an Indian woman, or, as some say, an Indian Princess, was given the secret of this treasure by his wife. He made many trips to the lake and must have been successful in his search, for he returned to Spain a very wealthy man

and bequeathed the secret of the lake to his king upon his death. The key to the treasure, or the " Derrotero " of Valverde as the guide is called, was sent by the King of Spain to officials at the town of Latacunga with instructions to make a search. Hence, owing to this and like catastrophes, survivals until the present day of such ancient or antique objects are very few.

Frequently the term gold-plate is used when silver-gilt metal is alluded to. The cost of this operation is thus shown upon an invoice made out by the firm now trading under the name of Garrards, Ltd., to the Lords of the Treasury in the year 1761.

" For new gilding, 13717 oz., 15 dwt. of store plate, chapel plate, etc., £2,213 0s. 2d.," that is about 3s. 4d. the oz. weight. The same account contains the following quaint item: " For loan of diamonds valued at £375,600 at £4 per cent., £15,024." An uncommonly fine bargain for the lender ! Possibly the charge included insurance !

Apropos of gilding, many of the objects unearthed belonging to the Bronze Age bear traces of a golden colour, suggestive of gilding, but the process does not appear to have been known in Britain prior to the Christian era. The modern method, performed by electricity, is able to deposit an almost infinitesimal amount of gold upon the baser metal, as many purchasers have found to their disgust.

Electro-gilding is simple in operation. A solution of cyanide of gold is prepared in cyanide of potassium, and heated to about 160° F. An anode, composed of a pure gold plate is introduced, and attached to the negative element of a galvanic battery. The articles required to be gilt are hung upon the wire, attached to the positive element, and immersed in the solution. Almost immediately, a film of gold is formed upon their

surface, the thickness of which varies with the length of time that the objects are immersed.

The preparations of gold most used in commercial manufacture are chloride (for photography), gold plating, wire, and gold leaf.

Mr. Gee, in his *Goldsmith's Handbook*, gives the following description of the method employed to prepare the latter—

"Fine gold is of a very malleable temper. It spreads under the hammer more than any other metal, and may be worked into almost any form or design by the hand of a skilful workman. There is no metal that can be extended so much by hammering or rolling, as pure gold." "One ounce," says Smith in his *School of Arts*, "beaten into leaves, would cover ten acres of ground." "It will so yield to mechanical force," says Lutschaunig, "that it may be reduced to the 200,000th part of an inch in thickness." For manufacturing purposes these extremes are seldom or never reached. Practically the limit to which fine gold is now reduced as regards thinness is in the gold-beater's art, where it is so wrought that a hundred square feet of it weigh only one ounce, and this would cover only the 480th part of the space mentioned by Smith. The metal employed by the gold-beater should be pure, or very nearly so, but it generally consists of about 23 carats. The various colours which this kind of gold presents, are obtained by alloys with silver and copper in different proportions. The pale leaves consist of twenty-three parts of fine gold and one part of silver; the deep-coloured leaves, approaching to a tint of red, contain twenty-three parts of fine gold and one part of best Swedish copper; the fine orange-coloured, more met with, contain half-part of silver, and half-part of copper to twenty-three of fine gold.

Too much silver in the alloy is an obstacle to the gold-beater, in consequence of its hardening properties, therefore its use should be avoided as much as possible.

Gold-beater's gold is prepared by taking the right proportions of gold and alloy, and melting the mixture in a crucible; it is then cast into small oblong ingots, each about three-quarters of an in. in width, and $1\frac{1}{2}$ in. in length, and weighing about 2 oz. Each ingot is afterwards rolled very thin between two reversible polished steel rollers, the gold being often annealed in order to render it soft, as it has a tendency to become hard under this process; by this means it can be reduced with little expense into a very fine riband, of not more than one 800th part of an in. in thickness. It is then cut into lengths about 1 in. square. A number of these are taken and secured by a most useful contrivance. With a sixteen pound hammer, having a smooth convex face, the gold is then beaten until its dimensions are considerably extended, when it is cut as before, hammered again, and if necessary the process repeated until it is of the proper thinness for transfer to the books in which it is sold to the public. These usually consist of twenty-five leaves each, when trimmed being about $3\frac{1}{4}$ in. square, and costing to the trade from 1s. to 1s. 3d. the book.

A large proportion of articles used in business or the home are enriched by the application of minute particles of gold. Signboards, china trays, book-binding, and book-edges, as well as many other objects show a golden gleam. The amount of the metal thus applied is infinitesimal, but it is practically irrecoverable. It is worn away almost imperceptibly by friction or exposure to the elements, and in this way the amount of gold devoted to gilding is really lost beyond recovery.

Manufacturers of jewellery embellish their work with

gold of different tints. The composition of these is thus obtained—

Yellow Gold	—pure and fine gold;	24 parts
Red	,, fine gold, 18	copper, 6 parts
Green	,, ,, ,, ,,	silver, ,, ,,
Blue	,, ,, ,, ,,	iron, ,, ,,
White	,, ,, ,, 12	silver, 12 ,,

In the latter case, platinum may be employed for colouring, but doubtless the price of this rare metal is, at time of writing, prohibitive.

The qualities employed for manufacture are respectively 18, 15, 13, 12, 10, 9, 8, and 7-carat.

Eighteen-carat gold is rather difficult to prepare, being subject to cracking under the pressure of the rolling-mill. Wedding rings of this quality must be hall-marked, and are subject to a duty of 17s. the oz., of which one-sixth is remitted on account of wastage. Fifteen-carat gold is considered the best alloy for prolonged wear. The alloy in this quality is not sufficient to mar the appearance of the gold, but it adds strength and durability to the metal. A very large proportion of goods manufactured in Birmingham are of 13-carat quality, the lowest that is capable of really effective colour.

The low price at which gold-leaf can be produced has already been remarked. It is astonishing with what cheapness articles of gold jewellery can be made. It must be remembered that the material is very thin, and that it has to be strengthened behind with base metal, and the rims, loops and rings are of plating. The workman can manufacture lockets of this description at a net cost of about 1s 3d. or 1s. 6d. each.

Mr. Gee thus describes the way in which gold-plating is performed—

" Gold-plating, like gold itself, consists of various

qualities, and is valued at from 2 to 15s. per oz. It is commonly prepared in the following manner: a bar of gold of the quality desired and one of metal (composition or gilding metal will do), are taken and made perfectly flat under the stamp or press; when this is done, the two bars are cleansed, by scraping or filing the surfaces which will subsequently come into contact; this process is of importance, and must be continued until every particle of black is entirely removed. Of the two, filing is to be preferred, because the file-marks have a tendency to assist the complete amalgamation of the metals. Some thick borax is next prepared, and well rubbed over the surfaces. The two bars are well secured together by strong iron wire, and are then ready to be united into one. There being several methods of effecting this, it will be necessary to describe them. First, the process known as sweating should be explained. The two metals, when perfectly secured, are placed in a "muffle," and made red-hot; the heat is increased until they are almost at the point of fusion. At this period the operation requires very careful watching, and when the metals have become united, the whole is withdrawn, and the amalgamation is complete. The second and best method, the one also, as far as we know, most adopted, is that of joining the two metals together by soldering.

There is a proverb that runs "all is not gold that glitters." An Exchange telegram, despatched from New York in June, 1918, conveyed a striking illustration of this adage. The message, headed in the *Daily Express*, "Kaiser's Cup Fraud," ran thus: "The alleged 'solid gold cup' which the Kaiser presented to Wilson Marshall, the American yachtsman in 1905, was given to the Red Cross by Marshall, and then put up to auction." The bidding ran up to £25. On Saturday

the cup was broken up to use the gold for other purposes, and it was found to be of pewter, and worth about £7."

A surprise of a different character was described in the *North China Herald* of 10th November, 1917. A Mr. Takehara, who owns a New York toilet saloon, was pestered by a hawker to purchase a small vase. "It was quite an ordinary shaped vessel, very much like a bottle tapering to a narrow neck, with two rings which dangled at its middle and made a musical tinkle as they hit against the sides. It was an endearing sound and Mr. Takehara's soul commenced to yearn for it.

"He thought that $6 is $6, and even more when it is reckoned up in cash, so the hawker left the vase undertaking to return on the morrow. He left, and Mr. Takehara continued to enjoy the sight of his new acquisition. It was not ravishingly beautiful, as has already been remarked, but there was that bewitching tinkle of the handles. The owner grew more and more interested in the vase and turned up some of his books on the subject. He found a description of such a vase. Such vases, the book said, must have been made some thousands of years ago. That made the $6 a good investment, but, reading further, Mr. Takehara learned that the genuine specimen would be made of gold.

"Mr. Takehara probably polished his spectacles and turned the gas a little higher and read the passage again. His first reading was correct. There was then only one test of the genuineness of the article—was it gold? A hurried visit was paid to a Japanese goldsmith in Boone Road.

"'Would you mind telling me what this is made of?' said Mr. Takehara, handing over the vase. 'Brass,' was the immediate reply. The tone would have been almost supercilious used by a subject of a less polite nation. The decision with which the opinion was

passed deterred Mr. Takehara not one whit and he urged that tests should be made.

"This was done, and the final verdict was that the vase was of gold. Mr. Takehara has disposed of his business and he is going back to Japan in a few days. The vase, which is about 5 in. high and 11 in. in circumference at its widest part, is estimated to be worth Yen 150,000. It is said to be about 4,000 years old."

CHAPTER XII

GOLD AND THE GREAT WAR

THE extreme nicety of the equilibrium by which modern finance had been adjusted was revealed immediately when the participation of the British Empire in the Great War seemed imminent. So long as credit was freely given and taken, transactions, whatever their magnitude, could be adjusted on paper, but when uneasiness was engendered by the uncertainty of the course of events, and by the absolutely abnormal conditions which obtained in Europe, money instantly became in keen demand, that is to say, money of legal tender—not necessarily metallic.

The issue of Bank of England notes was limited, for, with the exception of a certain defined amount, it had to be covered in actual gold—coined or uncoined. At the close of July, 1914, gold was in great request for abroad, owing to the withdrawal of balances held here on foreign account, and consignments were hurried out of the country by every possible route and method of conveyance, even by warship. This drain of gold for abroad depleted the stock in the Bank of England, for almost the only way in which gold has been obtainable in considerable quantities has been by presentation of Bank of England notes for encashment.

Inasmuch as the public, possessed by the increasing fear which always spells panic, embarked upon the same errand, namely, the withdrawal of their bank balances with a view to hold the equivalent cash in their personal custody (a really much less safe proceeding than to leave them in the hands of their banks), matters were made

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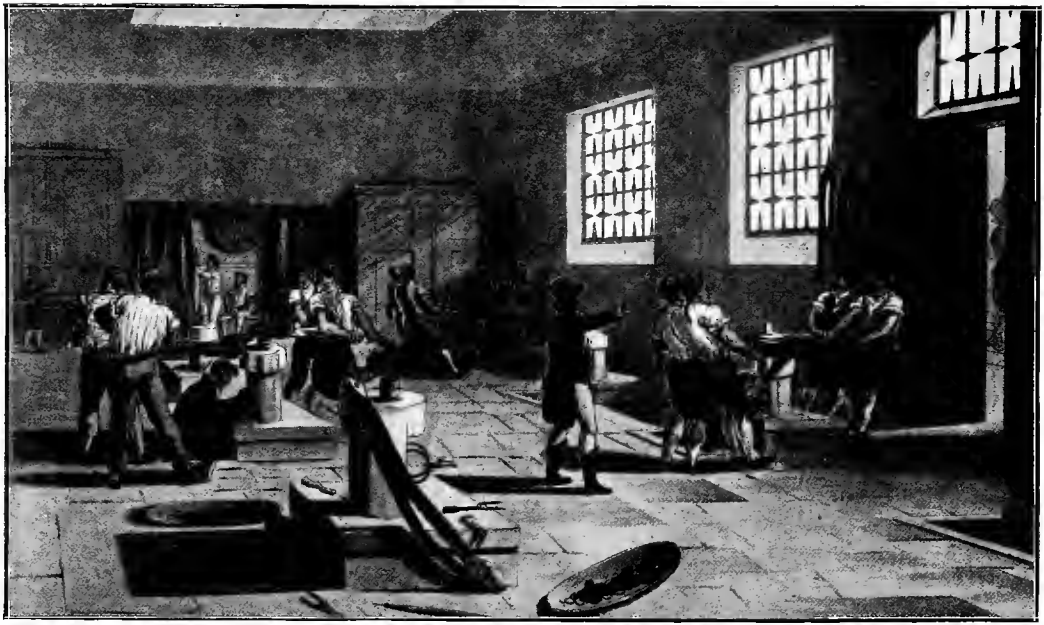
worse, *and a gold famine became imminent.* The banks were in danger of becoming unable to meet the demands of their customers. Legal tender money then consisted of Bank of England notes and gold and silver coin, but, as has been already stated, the stock of bank notes having been "mopped up" in order to secure gold for abroad, the only money available for public use was gold and silver, of which the supply rapidly declined.

In these circumstances the Government prepared a special issue of Treasury currency notes during the few days ending 6th August, when the banks were closed be decree. The issue of these notes removed the scarcity of money, and restored public confidence. It did more than that. So far as Great Britain was concerned, it divorced the unit of internal currency from gold—made it independent of the metal. So far as the world at large is concerned the result of this momentous step may be far-reaching, for it indicated in practicable fashion, what had been held theoretically, the distinctive internal and external functions of money.

Before the close of 1915, a gold reserve of £28,500,000 was accumulated and held against the Treasury notes, which from face of circumstances, reached very large figures as they took the place of gold withdrawn from circulation, and met the demand consequent upon higher prices for commodities.

By the courtesy of the *Bankers' Magazine* the following remarks, which appeared under the author's name in the issues of that periodical for May and June, 1918, are here reproduced with the object of indicating the relation between gold and paper currency.

When the periodical return of Treasury currency notes appears in the Press, the reader is apt to remark the continuous increase of the total from the first day



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AT THE ROYAL MINT. FROM A PRINT BY ACKERMANN

of issue, and to wonder by what process, apparently automatic, this increase takes place. Possibly he may dismiss the matter from the mind with the idea that the Government has found an easy method of borrowing from the public, or that, instead of providing funds to meet certain Government indebtedness, it has adopted the simple practice of printing a sufficient number of notes for the purpose. Both assumptions are perfectly erroneous; as a matter of fact, the authorities would much prefer that the issue should remain within more stringent limits.

Treasury currency notes were issued in August, 1914, in order to provide banks with a stock of currency sufficient to meet the exceptional needs of their customers as a consequence of the abnormal conditions arising from the war. In ordinary circumstances, a quantity of gold "till money," amounting to substantial sums, was held for the normal demand. A return made by banks in the United Kingdom (including the banking department of the Bank of England) of their gold holdings on the last week day of June, in each of the seven years ending with 1915, gave the figures which follow—

1909	£49,231,074
1910	44,214,173
1911	54,009,977
1912	60,640,681
1913	69,524,127
1914	82,794,963
1915	110,128,109

The great joint stock banks, some time before the war, had entered upon a settled policy to increase metallic reserves outside the Bank of England, where, however, they always maintain a credit balance, which they regard as equivalent to gold,

in case of need. Hence, at the beginning of the critical days at the end of July, 1914, a sum of gold, doubtless considerably exceeding £80,000,000, was held in the vaults of the banks, and a sum, difficult to ascertain, but probably almost as much again, was circulating in the pockets of the people, or was deposited in some temporary resting place. Wherefore, to regard £150,000,000 as the amount of gold coin in the United Kingdom, exclusive of the Bank of England note reserve, is by no means an over estimate of the position at that period.

Assuming this figure to be fairly correct, it is evident that as it became necessary for the Bank of England in course of time to marshall the gold resources of the country in order to support the demands of international finance, the issue of currency notes was bound to reach this figure, in order to fulfil the double function of providing the banks with a stock of "till" money, and of replenishing it, as customers asked to be supplied with legal tender money.

On 28th March, 1917, the above estimate was nearly covered by the total issue of Treasury currency notes which then stood at £144,587,000. So far, therefore, the increase of these notes can be regarded as just about as what might have been expected. Subsequent additions undoubtedly were assisted by a rise in the earning power of labour, by the lamentable neglect of those classes enjoying unexampled wages to make advances to the State (from the exigencies of which their prosperity is derived), and also by an increase in the cost of the commodities, as shown by index numbers.

The condition of affairs now became such that wage earners had almost a difficulty in spending freely. Railway facilities were curtailed, and the number of

pianos and similar, often quite useless, articles of luxury which could be added to the household equipment was necessarily reaching a limit. In fact, without doubt, surplus money began to accumulate heavily in the pockets and coffers of people. Neither investing it, nor placing it in the saving banks or Post Office, earners became so well off that, instead of the few shillings customary in the pre-war days, they carelessly allowed many pounds (in the shape of Treasury notes) to remain in their personal possession from week to week.

In normal times there was a remedy for this. When a bank was asked to provide cash in the shape of gold for a client, it drew first upon its own till money, and then recouped itself by drawing on the Bank of England for supplies. The banking department of the Bank of England, in its turn, when it found its stock of cash depleted, asked the issue department to cash in gold some of its own notes, which it always holds as a part of its banking reserve (a portion of this reserve may be taken to represent the balances of the great joint stock banks, etc., at the Bank of England). Hence, if more currency, that is to say, sovereigns, were demanded as a consequence of national prosperity, the gold held in the Bank of England note reserves diminishes. The official Bank of England rate for discount would then be raised, and the situation would be righted as a result of one of two things happening. Banks would raise their rates of interest, and encourage deposits from their customers, or gold would be attracted from abroad.

At the time to which we are referring, neither counterpoise existed; gold could not be attracted from abroad by a rise in the rate of interest, nor was it advisable to raise the bank rate, because of the fact that the bank was a constant borrower.

As banks must be supplied with sufficient currency

for the needs of their customers, and incidentally for the requirements of trade, the Treasury issued currency notes for the purpose as and when required up to 20 per cent. of their liabilities on deposit and current accounts. As long, therefore, as exceptional profits were made, and workers obtained more pay than they could spend conveniently, and neglected to invest it as they should, the total of Treasury currency notes was bound to reach still higher figures.

The increase in the holdings of gold by the banks of the United Kingdom, 1915—about £17,400,000 more than the total for 1914—seems to indicate that these banks held a larger amount of "till" money than was customary prior to the war. If so, a substantial portion of the currency note issue naturally was to be found in their cash reserves.

To sum up, the prosperity of the working classes, the rise in the price of commodities, and larger cash reserves in the banks, readily accounted for the steady demand for additional currency. This demand, failing gold, could only be met by the issue of fresh currency notes, the amount of which, after all, probably did not exceed the gold which would have entered into circulation had supplies of this metal been available, instead of being applied to the more pressing purpose of financing foreign trade.

Not Great Britain alone, but all militant, and many neutral, countries modified their currency systems in some form or other during the period of the war. New forms of currency, particularly of small denominations, were brought into existence in order to remedy a shortage of coin, whilst, in some cases, note issues were expanded deliberately, irrespective of the amount of metallic reserves, as a ready means of financing the cost of military operations.

Thus the changes which took place with regard to paper currency may be regarded as falling under two heads, namely, those made for convenience and those for profit. Striking examples of the latter are to be seen in the case of Austria and Russia, where the printing press was employed in order to create funds, as soon as the need for money on the part of the State exceeded the power, or the willingness, of their people to lend. The names of both these States ceased to find a place in the columns of financial papers, where the note issues of State Banks are usually to be found detailed.

State Banks' issues, however, by no means show the total addition to the paper currency of belligerent countries, for, in the case of Germany, notes have been issued on an extremely large scale by other banking institutions. These notes possess no reserve of precious metal at all, and the realizable value of such reserves as they do possess is more or less problematic.

The mere fact that the amount of notes issued by a State Bank or Government has increased in larger proportion than the metallic reserves there against is not necessarily proof that it has been caused by a deliberate attempt to find funds for war purposes. It may indicate that it has arisen through the need of the Government concerned to find gold for war purposes. For the latter reason, gold coins have been withdrawn gradually from circulation throughout combatant countries in order to pay for imports, which otherwise would not have been obtainable failing a suitable *quid pro quo*.

If it were possible to compute the exact amount of additional currency demanded by the increase in the cost of commodities and wages, and of the larger amount of money carried in the pockets of the people,

the total thus calculated, plus the actual amount of gold withdrawn from circulation, would represent the addition to the fiduciary reserves which could be made without charging the Government concerned with inflating the currency, in order to find funds for financing the cost of the war. In other words, any Government confining its paper issues within such limits would be merely supplying legitimate demand for increased currency, and borrowing from its people a commodity specially marketable abroad.

In the case of Great Britain the difference between the gold reserve of the Treasury currency notes (28,500,000), and the total issue on 1st May, 1918 (£238,057,095), was £209,557,000. Adding the increased uncovered amount of Irish and Scotch notes, a net total of about £230,000,000 is obtained as the amount of fresh paper issued uncovered by gold issued during the war up to the end of April in the United Kingdom and Ireland. This is not excessive, viewed in the light of changed conditions owing to the war as already set out.

The state of affairs in Germany is a marked contrast. On 15th April, 1918, the State Bank notes in circulation, equalled £586,360,000, against which only £120,388,000 was stated to be held in gold and £6,021,000 in silver, leaving an acknowledged uncovered balance of £459,951,000. This, however, by no means represents the total paper currency uncovered by bullion. Almost immediately after the outbreak of war, loan banks were instituted, authorized to issue notes, of which, on 28th February last, 6,532,000,000 marks, or say, £326,600,000, were in circulation. Against this large sum probably no metallic security is held whatever. Other descriptions of currency exist, for many German towns have issued local currency in small denominations,

very little metal being available for such a purpose. The grand total, therefore, of uncovered paper currency issued by Germany up to the spring of 1918 certainly exceeded £800,000,000. Allowing £10,000,000 as the amount uncovered before the war, Germany may be said to have then put at least £790,000,000 fresh paper money into circulation. This huge amount is in reality a forced loan from the German people, and cannot have been put into circulation without inflating the currency to a very appreciable degree. On the other hand, in Great Britain, the additional quantity of notes created had been a matter of convenience in substitution for gold, a medium used formerly for internal trade, but now applied to the more useful function of paying for goods imported from abroad.

It will thus be seen that gold is not by any means essential as money, but nevertheless that extreme care should be exercised in order that the substitution of paper currency, possessing legal tender value, should not be issued unduly in excess of the metallic currency, which otherwise would have been needed. In other words, inflation of currency produces results which present a danger to the community. How the evil of creating too much currency can be guarded against, when once the check afforded by the limit of gold production has been discarded, is a problem which awaits solution. The world, as a whole, will possess after the war a mass of paper currency very many times larger than before that epoch-making event, though a certain school of bankers may deem it necessary for paper money to be almost completely backed by gold reserves. Some considerable time must elapse, at any rate so far as the issues of Great Britain are concerned, before such a counsel of perfection can be obtained. The issue of British Treasury notes alone may exceed

£300,000,000 before hostilities are concluded. Even if it were possible to apply *all the gold production within the Empire* to this purpose, the operation would take some five years to complete.

Only the needs of Great Britain in this respect have been touched upon. There remain those of other portions of the British Empire—the Allies, the neutrals, and the far greater necessities of the enemy nations.

In speaking of British possessions, the Indian Empire must not be forgotten, for it has been the largest consumers of gold in recent times. Its claims will be presented with considerable force as soon as gold movements become less restricted by Governmental action, and it will be difficult to deny it some imports, however small the proportion may have to be of the £11,000,000, which it received in the average during the years 1912–1916.

The following extract from the *Annual Bullion Letter* of Samuel Montagu & Co. for 1916, indicates that a surplus of gold may be revealed in certain countries when conditions have become more normal, but, it must be remembered that these countries do not possess large stocks relative to the world's need of gold, although their holdings may be considerable as compared with their customary stock.

"In the spring a remarkable action was taken by Denmark, Norway, and Sweden, in succession. They released their respective State Banks from the obligation of buying gold at a fixed rate, as heretofore. Our last annual circular alluded to an apprehension in the financial circles of the United States of America lest excessive imports of gold should lead to an inflation of currency, and it was remarked incidentally that 'a glut of gold has its disadvantages as well as a deficiency.' The action of these Scandinavian countries

is an emphatic confirmation of this statement. The States were moved to seek legislative assistance because they would have been compelled under their Charters to hold unduly large amounts of gold without obtaining corresponding profit.

"So reluctant was Sweden to receive payment in gold, that a parcel shipped as a remittance to that country was refused by the Riksbank at the normal price, and only received, as a matter of grace, at 3 per cent. below. Thus gold was at a discount in Sweden as compared with its currency."

Bearing in mind the creation of Federal Banks in the United States of America, and the issue of notes against their resources—which only consist to a limited extent of gold—and remembering how much more important a share the United States, enriched and vitalized by its war activities, may demand in the way of reserves, there seems some good reason to think that gold in future is likely to figure as a reserve for external contingencies rather than for internal needs, and that a large proportion of paper money, manufactured during the war to meet emergencies, will remain a permanent institution in the daily life of many communities, which, heretofore, had been accustomed to the use of metal money alone.

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