

correct averages, we will find that the gold value of the exports of the last six years compare as follows with the imports.

Fiscal year, (specie included.)	Imports, (specie included.)	Exports, (specie included.)	Excess of imports
1861-2.....	\$275,300,000	\$226,300,000	\$49,000,000
1862-3.....	252,900,090	243,600,000	9,300,000
1863-4.....	329,500,000	220,400,000	109,100,000
1864-5.....	234,400,060	209,400,000	25,000,000
1865-6.....	437,600,000	430,600,000	7,000,000
1866-7.....	412,200,000	355,200,000	57,000,000
Total.....	1,941,900,000	1,685,500,000	256,400,000
Average.....	323,600,000	280,900,000	42,700,000

According to these figures it appears that, for the six years ending on the 30th of June last, the trade balance against us was \$256,000,000 in gold. We have no doubt that this exhibit omits an important amount of the exports, inasmuch as the shippers' manifests, as presented to the Custom House, are generally more or less incomplete. It is, however, impossible to form any reliable estimate of the proportion thus excluded from the official returns. But, on the other hand, the high tariffs of late years have induced a considerable amount of smuggling, and have tempted importers, in many cases, to invoice their goods below the true value. The Secretary of the Treasury, in the last annual report, estimates that for smuggling, undervaluation of invoices and cost of transportation paid to foreign shipowners, 20 per cent. at least should be added to the imports. With due respect to official opinion, we are disposed to regard this estimate as somewhat exaggerated, but be this as it may, it may perhaps be safely assumed that the under-statement of the imports fully sets off the omissions in the entries of exports; so that the above balance may perhaps be taken as about representing the result of our trading account with the rest of the world. To this trading balance, however, must be added, an important amount for interest occurring upon foreign investments in this country. At the beginning of these war, the aggregate of our State, municipal, railroad and other securities held in foreign countries was estimated to be about \$250,000,000; which some good judges believe, has since, through the shipment of bonds, been more than trebled. Assuming the accuracy of these figures, it could scarcely be supposed that the interest for the six years would be less than \$125,000,000. Adding then, this interest account to the adverse trading balance, it would appear that, for the six years, we have incurred a total foreign indebtedness of \$380,000,000. In this estimate we make no allowance for profits upon the invoiced value of our exports, nor for the sales of American vessels to foreigners pending the dangers from Southern privateers, so that we may perhaps reduce this total to \$350,000,000 as the best attainable estimate of the net adverse balance accruing on trading and interest accounts since July 1, 1861.

These figures may appear startling, and may seem to countenance the idea entertained in some quarters that there is outstanding against this country a large open balance ready to be called home upon any financial or political emergency in Europe, and threatening an embarrassing drain of gold. An idea of this sort has been the nightmare of the Gold Room, and has created much, as it appears to us, unnecessary apprehension. We have little question but that nearly the whole of this balance has been set off by securities. It is not a supposition at all accordant with sound banking, much less with the caution with which financial operations have been conducted in Europe for the last eighteen months, to imagine that a balance running far up into the tens of millions would be allowed to accumulate here uncovered. With the constant danger of war in Europe, and the heavy losses connected with the cotton trade, it may be taken for granted that European bankers would not allow unusually large balances to remain here in the hands of their agents. Nor is there any palpable evidence that the foreign bankers of this city hold any such extraordinary balances as this supposition implies. If they

were under advances to any very extraordinary extent to importers, banks or bankers, surely there would be more tangible evidence of the fact than is any where apparent. Nor is there any necessity for resorting to this extraordinary supposition; for it is not unreasonable to estimate that the Government and other securities sent abroad have realised sufficient to offset the balance against us. It is now very generally estimated among foreign bankers that the amount of United States bonds held in Europe cannot well be less than \$550,000,000. Of the whole issue of \$515,000,000 of Five-Twenties of 1862, probably there are at least \$450,000,000 in foreign hands, judging from the scarcity of the bonds in this market, notwithstanding they command 3@4 per cent more than other 6 per cent. bonds; and it cannot be an outside estimate to suppose that of Sixes of 1881, and Five-Twenties of 1864 and 1865 there is \$100,000,000, or more held abroad. If to this \$550,000,000 of Government bonds we add say \$50,000,000, as a probable estimate for all other securities exported during and since the war, it would appear not improbable that we have sent out, as an offset to this balance, about \$600,000,000 of securities. What the export of these securities has realised we have no means of knowing. In order to cover the adverse balance, they would require to have realised upon an average sixty cents on the dollar, in gold; which is perhaps just about the figure at which most parties familiar with the course of the foreign bond market would estimate the average cost of our securities to European holders.

We make no pretensions to precise accuracy in these estimates, for, in the absence of records, precision is out of the question. If we have succeeded in giving very probable guesses, then we have contributed something toward divesting a very important question of much vagueness and misapprehension.—*Hunts Merchants' Magazine.*

## SCIENCE

### Animal Electricity.

To the agency of friction, the amber of the ancients, the chemical action of modern voltaism, the mysterious properties of natural and artificial magnets or loadstones, and that peculiar vital principle inherent in certain animals, are due all the effects generally included in the comprehensive term electricity. If to these primary causes we add those of terrestrial currents and inequality of temperature, we provide, at least in theory, for all those atmospheric phenomena hitherto inexplicable upon any known data. If, as a certain eminent ecclesiastic remarked, "chance is a word to express our own ignorance," what a "chance" electricity must be. It is to the *savant* and the philosopher what "heart disease" is to the coroner and the faculty. Exactly a century ago galvanism was first discovered, and the term was applied to describe a species of electrical excitation, presumed at that time to differ materially in its origin from all other similar effects. Evidently the cause was referred to some muscular agency, which produced a peculiar sensation or taste when two dissimilar metals were applied, one upon the upper and the other upon the lower surface of the tongue. Sulzer who made this discovery, ascribed it to some vibratory motion produced in the nerves of the tongue, naturally a highly sensitive organ, and inferior in that respect only to the eye. Galvani, whose name is familiar with the celebrated experiments upon the limbs of frogs freshly killed, more fully developed this theory, and was the father of a new school, which, while recognizing the cause of these post-mortem effects to be connected with electricity, yet affirmed that they were due to some especial modification of that unknown agent, residing solely in the animal system, and consequently bestowed upon it the appropriate name of animal electricity. The celebrated Volta was the first to successfully dispute this view of the subject, and to establish the identity of the origin of galvanic and electric phenomena. Recent experiments have confirmed the theory that animal electricity does not owe