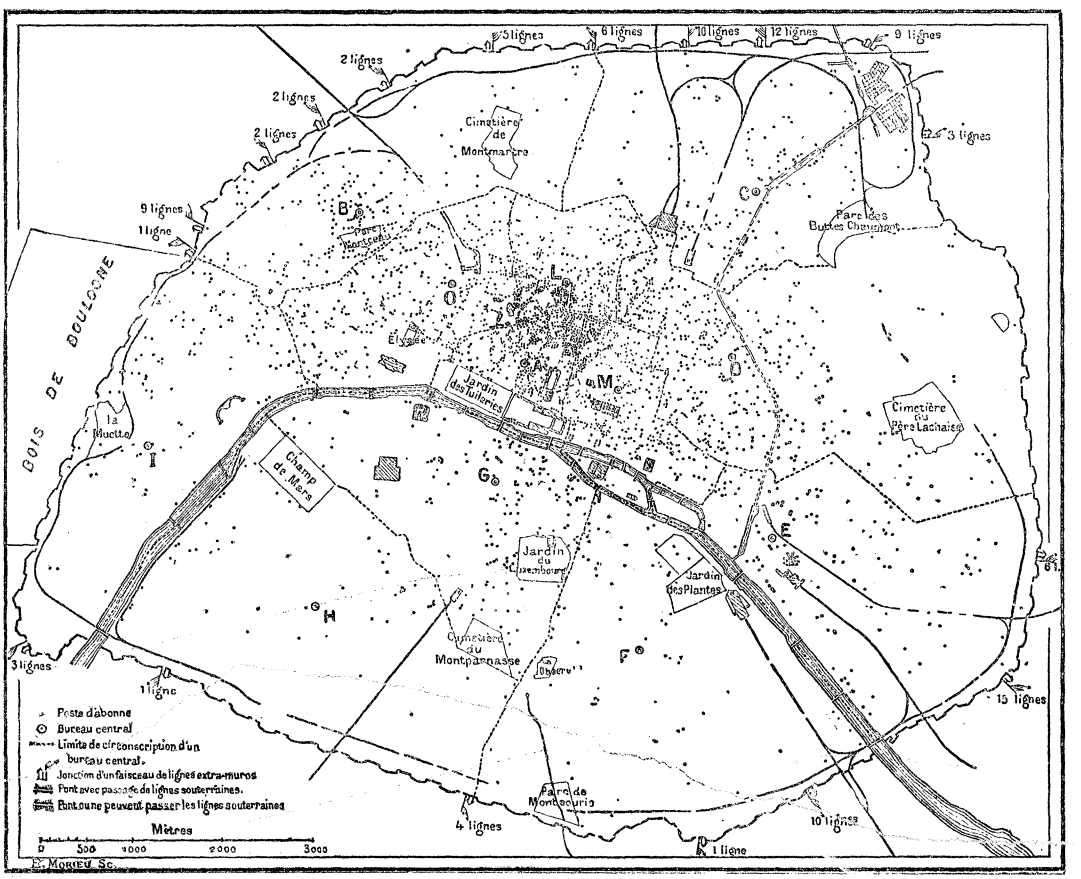
ed by dots: it shows the central bureaus, A, B, C, D, E, F, G, H, etc., and gives other information as indicated in the legend.

The telephone system of Paris is, after that of America, one of the most prosperous, numbering at the end of last April thirty-eight hundred subscribers, very unequally distributed over Paris and the suburbs, as is easily seen from the map which shows their distribution Oct. 1, 1884, with the points of attachment of the lines outside of the city walls starting from each of the gates. In the Opera and



MAP OF PARIS, SHOWING THE DISTRIBUTION OF TELEPHONES (*La nature*).

Sentier districts, the subscribers are most abundant. There are a dozen district offices so distributed as to insure the service with the minimum of conductors; the system being, as is known, almost entirely subterranean. Between each of these twelve offices, and the eleven others, there are auxiliary lines sufficient to establish communications between the subscribers, by passing through two district offices at the most, whatever be the distance between the subscribers. The number of these auxiliary lines naturally varies with that of the subscribers connected with each district office.

PROFESSOR SUMNER'S ECONOMIC ESSAYS.

"ONE may read, in scores of books and articles, that political economy is passing through a transition stage. . . . It is certainly true that there is no body of economists engaged in carrying on the science of political economy by a consistent development of its older results, according to such new light as can be brought to bear upon them. . . . A host of writers have been busy for the last twenty years, introducing conflicting and baseless notions, which, for want of a competent criticism, have won standing in the science. Others have made a boast of turning their backs on scientific method, and of describing, by way of contributing to political economy, some portion of the surface appearance which is presented by

Collected essays in political and social science. By WILLIAM GRAHAM SUMNER. New York, *Holt*, 1885.

the mass of economic phenomena in their sequence, variety, and complexity. That is as if a historian should boast of abandoning the attempt to trace social forces in history, and of returning to the description of royal marriages and diplomatic intrigues."

Professor Sumner thus describes, in the opening sentences of the second essay in the volume before us, the present condition of economic science. That such a description should be in the main a true one is deplorable; and Professor Sumner is deserving of all commendation for his stanch loyalty to well-established economic doctrines, and to the cause of scientific method as against empiricism in economic research. But if the world has been going astray in recent years, we do not believe it has been solely because we are a stiff-necked generation. Much has doubtless been due to the sins of the time; but much, too, can be traced to the shortcomings of those who maintain the true doctrine. Probably nothing has done more to discredit the authority of economists of the English school than the wide-spread opinion that they decide every question of political economy, however complicated, by an offhand application of a few simple principles. And it does indeed belong to the intrinsic character of their investigations that a few leading principles are kept constantly in view, and that questions which would otherwise be involved in hopeless confusion are thus made amenable to orderly and systematic and frequently successful treatment. Too many writers, not without standing and authority, not without learning and penetration, have, however, gone farther, and fallen into the way of cutting the knot of every intricate problem by a single sharp and decisive blow of the sword, — by an appeal to the magical force of a great economic law. They have thus given the objectors to the science of Ricardo and Mill a real and important ground for their criticism

Unfortunately, Professor Sumner too often places himself in the ranks of the writers we have just been describing. In the volume before us there are three economic essays, — on bimetallism, on wages, and on the argument against protective taxes. In the first and third, there is before the writer a distinct fallacy to refute, a distinct outrage upon economic doctrine to resent; and it is in such a situation that there is the strongest tendency to crush an opponent by a single blow, to sweep away all argument by a single appeal to an all-comprehending principle. Accordingly, we find that Professor Sumner's argument against the possibility of a concurrent circulation of gold and silver may be summed up in the mere *dictum*, that, since supply and demand regulate value, all the governments in the world could not make silver and gold circulate together; and his argument against the belief that protective taxes may in some cases contribute to the general prosperity is little more than the bald statement that restraints upon commerce introduce no new productive power, and hence cannot increase the aggregate production, while, as every tax and every restraint involves waste and loss, there is sure to be a diminution in the aggregate production, and a fall in the general prosperity.

Considerations such as these are very good as far as they go, and are indeed of the highest importance. They give a *prima-facie* reason for believing that those who expect economic advantage to arise from protection, or who think it possible to make gold and silver circulate side by side as prime mediums of exchange, are mistaken. One may say more: it needs but a brief and clear exposition of general principles to take the ground from under the feet of all the ordinary advocates, on the stump or in the newspapers, of protective taxes or bimetallic currency; or, rather, to show that such advocates, ignorant of the first principles of political economy, and heedless of the simplest requirements of sound reasoning, had no ground to stand upon. But there are men who know something about political economy, and still think that an agreement of all the commercial nations of the world could keep silver circulating alongside of gold at a constant ratio: they have heard of supply and demand, and have some understanding of its working; they know, as well as Professor Sumner does, that congress cannot, that all the governments of the earth cannot, enforce a fiat that a pound of meat shall have the same value as a pound of sugar; they know also, however, that the demand for the precious metals comes in a very great measure from their use as coins, and that their use as coins is in a great measure affected by the more or less arbitrary action of governments. It behooves an economist, under these circumstances, to point out, if he can, that the influence of governmental action upon the demand for gold and silver has such bounds, that variations in the supply might occur — or must occur — sufficient to overbalance that influence. Professor Sumner contents himself with repeating, in every variety of expression, the assertion that government cannot confer upon any thing a higher value than that which is determined by demand and supply.

"Congress cannot regulate the value of money until it can make a man give for a gold dollar one grain of wheat more than supply and demand force him to give, or yield a gold dollar for one grain less than supply and demand will give him for it. . . . It cannot regulate the value of a coin, any more than it can regulate a physical object to make it longer or shorter than it is. . . . To secure a concurrent circulation, then, at a fixed ratio, it is necessary to suppress the effects, which can only be done by suppressing the forces; so that a concurrent circulation could never be realized until we could extinguish economic forces by human agency." Now, all this might be well enough by way of reply to one who was ignorant of the existence of 'economic forces' and the rest; but of what avail is it as against a man whose mind is troubled by the fact that governmental action is itself, in the matter of currency, one of the most constant and apparently important of these 'economic forces'? Intelligent doubters and honest opponents can be but little influenced by the levelling of economic anathemas at them: they can only be won over by a fair statement of the strongest arguments that can be urged on the other side, and a refutation of them.

Similar objections apply with equal force to Professor Sumner's treatment of the subject of protection. It is of immense advantage to correct thinking on the subject, that one should see, first of all, clearly and unmistakably, that a protective tariff is a tax on production; that its immediate effect is to diminish production, to reduce the returns to labor and capital, to lessen the rewards of human effort. The demonstration of this important though simple truth at once clears the air of the mists and vapors with which it may have been filled by popular ignorance and misconception. But when it is urged by clear and candid thinkers that there may be cases in which, even upon purely economic grounds, it may be worth while to incur this loss for the sake of a future gain made possible by it, it is useless to dogmatically shut off discussion by simply saying that protection is an economic loss, and nothing but economic loss can come of it. There is not the least disregard of the principles of political economy in supposing that an industry which it would not pay to introduce in a given country, without government protection, might be a profitable and independent one after it was introduced. Lack of knowledge, national habits, the prestige of foreign manufacturers, — such are some of the causes which may prevent the rise in a given country of an industry for the pursuit of which its natural advantages may be exceptionally great; and it is simply impossible to 'demonstrate' that an industry may not thus be established a century sooner than it would otherwise be, and which, in all but its first years, would be a source of increased prosperity to all classes of the people. There are a thousand valid objections to protection even in this case, but it is not an economic absurdity. To say, as Professor Sumner does, that "it is mathematically impossible that it [a protective tariff] should ever issue in an independent and productive industry," is to vastly diminish, in the mind of an intelligent reader, the force of those conclusions whose truth has really been demonstrated.

Ungracious as it may seem, we have yet to draw attention to a special feature in the style and method of Professor Sumner's argument which is calculated to intensify the impression of dogmatism and reckless generalization which economic writing of this character so often produces. This is his constant employment of language borrowed from mechanics or physics, and especially his frequent appeals to the principle of the conservation of energy. Amateurs in natural science have shown, in the last decade or two, a very great fondness for this principle, and have delighted in exhibiting the facility with which, by its aid, they could solve the problem of the universe, or any smaller problem which might happen to engage their attention. But responsible writers on political economy — or, for that matter, on any other subject — will do well to leave the principle of the conservation of energy to play its proper part in its proper field. Some writers might be surprised to find how necessary it is even in that field, to use it in the exact sense in which it is understood by mathematical physicists; how little it enables one to do easy, offhand work, and accomplish the immediate despatch of all scientific business. One regrets to see even so much as the *term* used in discussions that are outside the domain of physics, for fear that the vagueness which must necessarily there attach to the term may affect the reasoning in which it appears; this, however, may in some sense be regarded as a matter of taste. But to use the principle of the conservation of energy by way of *argument* in economic discussion is utterly unjustifiable; and when a writer says that "to suppose the contrary" of an economic proposition, "is to deny the most obvious application of the conservation of energy to economic forces," he can but make the judicious grieve. The acme,

however, of this kind of writing and thinking, is reached by Professor Sumner, when, in one of the non-economical articles (p. 134), he gravely tells us, speaking of elections, that "they are not a source of energy, and therefore cannot cause any thing at all."

We have dwelt thus at length upon these faults, because we consider them as most hurtful to the cause of sound discussion, and to the influence of the very methods in political economy which, with Professor Sumner, we wish to see upheld. We have not attempted to give a full account, or, if one prefers the expression, a fair account, of the papers collected in this volume. In the article on wages, and even in those on bimetallism and on protection, there are instructive passages and telling points. The articles are not made up entirely of impatient assertion and sweeping denunciation. In the discussion of bimetallism, valid practical reasons are adduced against it, and the same is true with regard to protection; but it is precisely the theoretical core of the argument which is made weak and powerless by the defects which we have endeavored to point out.

SCIENTIFIC CULTURE.

THE question of the position of the physical sciences in courses of instruction, as compared to that of the classics, was scarcely thought of at the time when Professor Cooke began his work as an instructor in the experimental sciences thirty years ago. During this long service as a teacher and investigator, the question became a glowing one, but has been so far settled as to give to many of the essays of the little volume before us an historical rather than a current interest.

Nevertheless, the general reader who may care nothing for the Greek question will read these essays with pleasure. He will admire the earnestness and candor of the writer. He will follow with delight the limpid stream of argument and exposition. To the citation drawn from the literature of physics, to the effect that "such men as Davy, Dalton, and Faraday were as truly learned, as highly cultivated, and as capable of expressing their thoughts in appropriate language as the most eminent of their literary compeers," might be added the name of the author.

The most important statements which are made in these essays are quite independent of the subject-title. They should be printed after the manner of certain biblical texts, and displayed on the walls of every collegiate hall in the land.

We append a few of these paragraphs: —

"There is no nobler service than the life of a true teacher; but the mere taskmaster has no right to the teacher's name, and can never attain the teacher's reward" (p. 85).

"The teaching which a professorship implies, instead of being a hindrance, ought to be a great stimulus, to scientific investigation. Of course, this influence is greatly impaired, if, as in many of our colleges, the available energies of the teacher are exhausted by the daily routine of instruction, or by outside work required to supplement his meagre salary; but if the teaching is only moderate in amount, and in the direction of the professor's own work, there is no stimulus so great as that which the association with a class of earnest students supplies" (p. 280).

"Men of affairs should resign the endowments intended for the maintenance of scholars to those whose zeal is sufficient to induce them to make gladly the sacrifices which the advancement of knowledge usually entails" (p. 277).

Scientific culture and other essays. By JOSIAH PARSONS COOKE, LL.D., professor of chemistry and mineralogy ir Harvard college. Second edition, with additions. New York, *D. Appleton & Co.*, 1885.

AROUND AFRICA.

THE activity which the Germans have shown during the past few years in colonial and commercial enterprises has produced some good results, and has given occasion for a few good books, notably those of Schweinfurth and Nachtigal. Dr. Joest, instead of following those explorers into equatorial Africa, circumnavigated the Dark Continent, visiting only a few inland towns in the extreme south-east. He described his travels in a series of letters to the Cologne *Zeitung*, which form the basis of the present work. Schweinfurth and Nachtigal performed their tasks well, and gave us good common-sense accounts of the people they visited, and the countries they saw. So has Dr. Joest. His first stopping-places were Madeira and St. Helena, which have been so often described that he was able to add little of interest. From St. Helena he went to Capetown, or Kapstadt, as he in true German fashion insists upon calling it. And this is a good place to utter a protest against the habit which the Germans have of translating proper names; for, really, 'Kapstadt,' 'Tafelbai,' and 'Kapland' do not represent the places described. Indeed, either this fact seems to have struck

Um Afrika. VON WILHELM JOEST. Mit 14 lichtdrucken und zahlreichen illustrationen. Köln, 1885. 8°.