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Vested Interests in Scientific Research

By T. Swann Harding

A prominent industrialist once spoke of scientific research as being "the first line of defense of the capitalistic dynamic economy as opposed to a State-planned economy." Science thus itself becomes propaganda. Very often what appears to be an authentic scientific publication is nothing but disguised propaganda. Sometimes this is because one of the sponsors has some commercial, moral, religious, or public welfare interest he wishes to have served by a deflection of scientific findings to sustain his pet thesis. On the other hand, certain journals exist which print many purely synthetic articles written by ghost-writing bureaus to support the advertising propaganda of new drug preparations or healing devices with artificial clinical tests and synthetic case histories.

To a layman these publications are all esoteric, hence probably important. Science tends to be a glittering generality to most laymen, and its good name is therefore widely transferred to endless questionable products and causes. Actually technical articles, booklets, and monographs frequently represent many things other than the altruistic pursuit of science by unbiased workers in laboratories. This is especially true when the distorted results reach the general public in advertising, and in campaigns to make it drink milk, buy certain cigarettes, avoid alcoholic liquor, fight venereal disease, and so on.

Scientists cannot be held responsible for these perversions except, like the Curies, insofar as a curiously perverted sense of social responsibility makes them ignore the popular utilization of their discoveries. But scientists also tend to become at home in certain comfortable theories and hypotheses and to fight the new quite as do other human beings. They are slow to accept drastic adverse criticisms even if based on demonstrable facts. They are reluctant to examine and try new and unusual hypotheses. Moreover many of them are suffused with the fallacy that since they are expert on something they are expert on everything.

Foibles of Scientists

All unconsciously, scientists became propagandists of their own chosen ideas. Subconsciously they build up their own work to fortify their pet theories. Their methods and their findings are half-surreptitiously presented at their very best, or certainly in a little better light than they

assume in day-by-day laboratory work, or in other laboratories in the hands of others. Over and over again a new group of workers claims to have repeated exactly the experimental procedures of a predecessor group and to have got quite different results. But each scientist must aim to feel convinced that his methods are sound and his findings important. He is inclined often to become emotionally controversial at scientific meetings and to say things he perhaps does not fully mean.

He also, perhaps unconsciously, slants his work a little, due to imponderable pressures brought to bear upon him, or to please his scientific director and conform to the director's theories. The work of an entire institution is often bent to please its financial or political sponsors. Hence there are intense rivalries between institutions as well as between individual workers. Great forces often clash whether research is suported commercially, by private grants, or by taxation. No great public research institution is wholly free from the inroads of propaganda.

Manufacturing concerns propagandize the remarkable savings to the public due to their laboratory investigations, saying nothing about the fact that the basic investigation upon which the whole structure stands, and of which their laboratories merely made applications, was financed by a private trust or by government appropriations. In any case the public pays for the research—for industrial research in the form of a fraction added to prices. Furthermore the stated savings may or may not ever reach the ultimate consumer, who is demonstrably overcharged by really very excellent corporations which perform much creditable research in their laboratories. Monetary values assigned to scientific discoveries made in tax-supported institutions are qualified by many buts and ifs, for the savings, however accurately calculated, normally benefit others rather than the great public the institutions supposedly serve.

Commercial firms frequently maintain test laboratories predestined to make findings which seem to support contentions made in advertising and publicity campaigns. They issue pseudo-scientific or "research" publications which are subtly slanted and artfully prejudiced. Thus skilled treatment of data and deceptive use of line graphs may be used to "prove" that a liquid antiseptic (which is in reality little more than an oral cosmetic) is a mighty slayer of menacing germs. Wrong inferences abound; factual misstatements are far from infrequent.

Business and advertising unhesitatingly pounce upon the findings of unbiased research workers in the most reputable institutions and, by a process of elimination, deletion, perversion, and distortion make these seem

to support their contentions. Thus the Research Department of the National Confectioners' Association once apparently distorted the meaning of the picturesque phrase "fats burn in the flame of carbohydrates," to make people think eating candy would remedy obesity. For Dr. Meyer Bodansky protested to the *Journal of the American Medical Association* for Feb. 16, 1929, that he had used the phrase in his textbook merely to describe graphically the interrelationship in the intermediary metabolism of dextrose and fatty acids. This gave no warrant for the notion that a diet high in sugars would aid people to get thin. A grape fruit juice advertising campaign has used similar techniques.

The *Journal of the American Medical Association* for Oct. 28, 1933 carried a long editorial showing why it was unscientific to add vitamin A or carotene to cough drops. In November 1935 the Federal Trade Commission announced that Smith Brothers Inc. agreed to cease advertising propaganda that their cough drops or cough syrup were effective remedies in the treatment of colds, or to say that either preparation had a unique advantage over other similar preparations because of its vitamin A content. This sort of thing happens over and over again and is commonplace. Dangerous radium preparations kill some people and lethal preparations of sulphanilimide made up in diethylene glycol kill others, the murderous aftermath of basic scientific discoveries.

Effects of Commercial Pressure

AT OTHER TIMES commercial pressure is more insidious. It seeps through laboratory walls. It subtly induces workers in reputable institutions to produce and publish findings that seemingly confirm an advertising theory about certain foods, drugs, cosmetics, or tobacco products. A whole absurd structure of pseudo-science, a veritable caricature of science, is laboriously reared in the printed word and over the radio to establish the "scientific" contentions of some new cosmetic, toothpaste, cigarette, or antiseptic.

It is a mistake to suppose, as has been intimated, that research supported by public funds escapes all such pressure. Fresh fruit and vegetable growers are always able to procure, from research workers supported by their own State, results tending to show that arsenic and lead spray residues offer no menace to human health, or reports of new insecticides deadly to insects but harmless to man. Indeed an investigation being carried on in a federal laboratory to determine once for all what cumulative toxic effects such residues had was summarily discontinued, and the

animals destroyed, by an act of Congress instigated by individuals who preferred the facts to remain unknown.

Nutrition experts in Government agencies know that Americans consume too much sugar and cereals and too few fresh fruits and vegetables. But if they present the facts too forthrightly, loud protests arise from the cereal and flour interests. If it be said we eat too much meat the packers exert pressure. The sugar interests protest against any efforts to decrease sugar consumption in the interests of public health. Dairy scientists insist that children drink a quart of milk daily for health's sake, though nutrition experts are divided as to the necessity for that.

Right while state and federal food chemists are alarmed about the arsenic and lead spray-residue problems, governmentally paid entomologists are experimenting with adhesives and other means of making the poisons stick to fresh fruits and vegetables long enough surely to kill the insects that menace the grower's profits. Finally, other governmentally supported research workers are publishing imposing bulletins to prove—after a bit of very superficial and scientifically infirm investigation—that this or that new chemical is deadly to bugs, but positively harmless to human beings. When cases come to court all experts are equal before the law and the word of some prejudiced scientific worker with little specialized training or experience may outweigh the considered opinion of the greatest toxicologists in the land.

Any scientific publication of any sort may, for all the reader knows, represent the drive of a particular factor, interest, group, or prejudice. The article that so augustly proves that rats must have vitamin F, that they can absorb it through their skins, and that this is a new discovery, fails to reveal that vitamin F is just another name for linoleic and linolenic acids well known to occur in lard. Instead it is really propaganda to induce the makers of cosmetics to put "vitamin F" in their cold creams—this despite its figures, graphs, tables, and technical language.

The scientific article that presents a new and rapid method for the determination of the presence and effects of lead is not at all what it seems. The method habitually gives low results. It errs on the side of those inclined to be careless about lead spray residues and who therefore want it in the "literature" to quote for their own justification. Once in print it is sanctified and forms part of the scientific literature, the modern sacred texts. The same may be said for the medical article prepared by the ghost-writing and bibliography-searching bureau. Even the case histories are fictitious. But it tells how such and such a drug was successfully used

in so many cases of so-and-so. It now forms part of the "literature" and can be quoted as a proof text.

The 'Uses' of Science

IN SIMILAR MANNER science is abused in moral, racial, political, and religious campaigns. It is used to sustain the Nordic myth, to provoke hatred of the Jews, to denounce alcohol or tobacco, to defend eugenics, or to formulate the thesis (even in the formerly erudite *New Republic*) that the way to wipe out venereal disease is first of all to abolish prostitution. Science, so-called, is thus dragged along by the heels to support the preconceived views of the writer or group, constituting its unethical use for avowed moral or social uplife. Again facts and findings are suppressed. Again, also, scientists who neglect public relations, lay education, economic factors, and social ends themselves contribute to the extinction of the free spirit of inquiry by totalitarian governments founded on dictatorship and false racial theories.

The biochemist L. J. Henderson, and others, demonstrated conclusively that the theory of acid-base balance and dietary acidosis is untenable and fallacious, but the theory marches on. The physiologist Yandell Henderson, and others, proved that the effects of alcohol on human beings are ill-understood, while there is a wide variety of literature on its apparent toxicity and its productivity of cirrhosis of the liver—both for and against. The same diversity of opinion exists about the evil effects of smoking and the causes of dental caries, but such divided authority bothers those in charge of moral or advertising campaigns not the least bit.[1]

Those who condemn the use of tobacco, the drinking of alcoholic beverages, or of tea, coffee or soda pop, always try to back their propaganda with a transfer of scientific prestige. Today it has been shown that the old so-called whisky paralysis, in other days attributed to drinking, is due

[1] The *Journal of the American Medical Association* for March 14, 1936, in answer to a query, said that the toxic effects to human beings of tobacco and its smoke as customarily used had not been definitely established. In the following references Dr. Abr. L. Wolbarst of New York gave considerable proof to indicate that the suppression of prostitution will result in increased dissemination of the venereal diseases: *New York Medical Journal,* May 4, 1931; *Social Hygiene Bulletin,* June 1921; *New York Medical Journal,* July 6, 1921; *American Medicine,* May 1924; see also: Mowry in *Illinois Medical Journal,* April 1921 and Lawrence, *Journal Social Hygiene,* Jan. 1924. The following articles argue pro and con about the relation between chronic alcoholism and cirrhosis of the liver—another as yet unproved relationship: *Journal American Medical Association,* June 18, 1932, p. 2213; Supplement to *Science,* April 3, 1936; *J.A.M.A.,* October 10, 1936, p. 1200; Belgian letter to *Medical Record,* Feb. 3, 1937, p. 132; *J.A.M.A.,* April 9, 1938, p. 1159. Fanatics have recently adduced what they call scientific evidence to prove that smoking tobacco causes cancer though the National Cancer Institute says this is a wholly unproved thesis.

to a lack of part of the vitamin B complex. Patients who are kept intoxicated recover from the paralysis, provided they are given the vitamin. The cirrhosis of the liver once surely attributed to alcoholism can no longer truthfully be so attributed, since expert opinion is divided on the subject, with the preponderance favoring the contrary. It has also been shown that the addition of dilute alcoholic solutions to food, as in wine drinking, effectively stimulates the flow of gastric juice and aids digestion.

Vegetarianism is a doctrine often sustained on the theory that vegetarian animals are not fierce, yet the bull, the African elephant and the buffalo, all strict vegetarians, are as fierce as any animals. Meat does not make the tiger fierce; it is being a tiger that does it. The raw and so-called "natural" food cults are often buttressed on "science", though scarcely any food is truly natural today, while cooking is known to improve both the digestibility and palatability of many foods. The wheat and potato plants as we know them today are far removed by breeding from their original wild or natural ancestors.

When it comes to the "science" served the general public by the more unethical commercial interests almost anything goes. Entire technical monographs have been studiously written to found a pseudo-scientific theory in the field of electricity, in order that they might be cited as "scientific" evidence for the validity of the principle involved in making a medical salve. Articles and booklets appear in profusion devoted to the erudite exposition of scientific principles about which true science knows and cares nothing whatever. The extent of this is all but incredible.

Deceiving the Elect

SOMETIMES THIS PROPAGANDA operates at so high a level as to deceive the elect. For instance, take the many impressive advertising claims made for tinted or specially shaped lenses in glasses. Some of the lenses eliminated "glare," others were made of special dark glass. One particular manufacturer invented the merry farce of quoting a serial number of a patent supposed to cover the formula for making his glass, the advertised product being sky blue and the formula productive of a brilliant, transparent glass of reddish hue!

This whole business of wearing tinted glasses lacks scientific foundation. Lenses of scarcely visible tint have no more value than so much window glass. They neither increase vision nor eliminate "eye-straining glare." The merits of wide-vision lenses are much exaggerated. A person will usually turn his head rather than roll his eyes abnormally. The

whole question of eyestrain and the function of glasses has been much suffused with pseudo-science.

Eye fatigue is in the main fatigue of attention. Eyestrain is as much a matter of psychological disturbance as anything else. The more-light-to-save-the-eyes doctrine, propagated by M. Luckiesch, F. K. Moss, and A. J. Pacini, has no standing with ophthalmologists, though it is a natural for propaganda by light companies. There is no dependable scientific evidence that dim light injures the eyes any more than there is that slight odors injure the nose and faint or indistinct sounds the ears.

Poor illumination causes neither nearsight nor any other organic eye trouble. The average person can judge the amount of illumination he uses with comfort and act accordingly. However, he can readily be fooled. In tests made on electrical workers it was shown some years ago that they would praise the better lighting effected when a mock change was made, the replacement bulbs being of exactly the same strength as those removed. Their work output also increased. At the other end of the scale they would complain about poorer illumination, when a mock change was made, and their work output suffered, though the lights were no dimmer than before!

Eyestrain does not result in organic disease of the eyes. Glasses are mere crutches which, however, lack therapeutic value, and "wrong glasses" do not injure the eyes, any more than they are injured by working with the light over the wrong shoulder, or by reading in bed, or on moving vehicles. But so confused are we by subtle pseudo-scientific advertising propaganda that we believe all sorts of things about our eyes, our surroundings, and our health generally which are untrue. The glasses, the illumination, and the position we assume while reading which give us the most comfort are all that is necessary.[2]

Glucose once had a bad name. That was when it was made by primitive methods and was often impure. Ultimately it appeared on the market rebaptized as "dextrose, the new health-giving sugar the body needs," yet it was neither to any appreciable extent. Vegetable fats were once considered inferior to animal fats for cooking purposes. But so successful was the publicity of the former that animal cooking fats now sometimes try to masquerade as vegetable fats in order to improve sales. Indeed

[2] For confirmation of material in the last five paragraphs see: W. W. Coblentz' report for the Council on Physical Therapy, *Journal of the American Medical Association*, 102 (April 14, 1934) 1223; Dr. David G. Cogan, "Popular Misconceptions Pertaining to Ophthalmology," *New England Journal of Medicine*, 224 (March 13, 1941) 462–66; *Management and the Worker*, 1941, by F. J. Roethlisberger and Wm. J. Dickson, assisted by Harold A. Wright.

certain scientists are right now working to impart to lard the superior appearance and keeping quality of trademarked vegetable cooking fats. We were once admonished to eat a box of raisins daily to get the iron we needed. Many other foods contained more iron than raisins. Aside from that, the one-ounce box of raisins recommended would furnish but one-twentieth of the quantity supposedly needed daily by adults.

In its issue for January 30, 1937, the *Journal of the American Medical Association* examined the propaganda put out by the California Fruit Growers' Exchange to the effect that Sunkist navel oranges were "22 per cent richer in vitamin C." This presumably was meant to reflect upon Florida oranges as a source of vitamin C. Actually, however, the difference in vitamin C content of large average samples of oranges from the two states was wholly negligible. The publicity was both misleading and unethical.

In its issue for April 19, 1938, the *Journal of the American Medical Association* printed a long editorial on a cosmetic cream containing a powerful sex hormone, the makers of which had elaborated an impressive scientific theory to put it over. The editorial claimed that the putting of the hormone substance estradiol in a face cream constituted a serious menace to health rather than an agency to restore the "pink freshness of a youthful skin" and ended: "The continued reckless and indiscriminate use of this substance in a cosmetic cream is certainly unwarranted until it has been proved beyond the shadow of a doubt that the menace clearly established in animals does not likewise prevail in human beings."[3]

This recital could continue indefinitely, but sufficient examples of such commercial perversion of scientific findings are well known to everyone to render this unnecessary. Even the specially tufted and shaped tooth brushes of varied design, each sold as alone scientifically correct, appeared to be all wrong when dental experts queried almost unanimously chose a straight trim on a straight brush! Meanwhile public organizations, some of them with the best of intentions, frequently abuse scientific knowledge in their propaganda.

Science and the Press

A FEW YEARS AGO the British Medical Association and the British Milk Marketing Board were in dispute about the advocacy of increased milk

[3] *New Hampshire Health News* for April 1938, published by the N. H. State Board of Health, carried an expose of the ridiculously pseudo-scientific claims made by another skin beautifier and cosmetic launched with high-powered publicity presumably buttressed firmly upon established scientific facts.

consumption in Great Britain where pasteurizing is not universal and tuberculin-tested cows are in a minority. The Board, for economic reasons in aid of the dairy industry, advocated increased milk consumption—even if the milk had to be given to the children of the poor. The medical association contended that it was much more important to advocate safe milk first of all, even if such insistence upon pasteurization and tuberculin-testing did temporarily decrease milk consumption.

But the newspapers affiliated with the British Newspaper Proprietor's Association were reluctant to use the medical association's propaganda. Therefore the association offered it in the form of paid advertisements. These the press association also rejected. Certain weekly journals of opinion with relatively small circulation did consent to print them, however. But they did so along with some caustic adverse comment about the newspapers suppressing opinion, and also anent the fact that, though the doctors probably did not know what they were talking about, they should be heard.

The British Medical Association felt that the dangers of drinking raw milk had been established scientifically, that heating milk to pasteurize it did not damage its nutritive qualities, and that even if such compulsory pasteurization of milk and herd testing did for the time decrease milk consumption and injure the dairy industry, it was obligatory as a public health measure. The marketing board was accused of overlooking the necessity for safe milk, of insufficiently emphasizing the health menace of raw milk, and of dwelling in its propaganda too exclusively upon the high nutritive quality of milk and its value as a food.

About the same time the Bureau of Milk Publicity of the State of New York was publishing paid advertisements in the press of New York State advocating the increased consumption of milk as a protection against colds. Milk was said to supply double protection, by contributing an alkaline ash and containing the anti-infective vitamin A. Here were twin fallacies. The acid-base-balance theory is not scientifically established and a glass or two of milk daily would not perceptibly change the body's chemical reaction anyway. The theory that "alkalinizing" will ward off colds is in a class with the theory that carrying a raw potato will ward off rheumatism, while vitamin A is not anti-infective in any such sense as would enable it to prevent colds.

Whether the advocacy of milk drinking at the rate of a quart a day for children is fully justified scientifically is still in doubt. Milk is naturally deficient in iron and in certain vitamins. It violently disagrees with many

people. Other foods can be used to supply any or all the nutrients customarily supplied by milk. The attempt to feed children diets that rapidly accelerate "growth" (really weight-gain) in rats has insufficient scientific justification, and that it is beneficial remains an unproven hypothesis. Yet all these debatable points are naturally ignored by any public bureau which sets out to aid the dairy industry. If it did not try to stimulate the consumption of dairy products it would soon get in trouble. The trouble would be nothing unique nor even especially reprehensible.

Just before World War II the frozen fruit ("frosted") and vegetable industry began to make serious inroads upon commerce in fresh fruits and vegetables. For this reason new associations of fresh fruit and vegetable shippers and dealers were hurriedly formed to combat the spread and popularity of frosted fruits and vegetables. They developed rather an interesting pseudo-scientific kind of propaganda, instead of merely making a declaration of war, and boldly stating that they intended to wipe out their competitors if this proved possible.

Resort was had to a tender solicitude for the public welfare and, naturally, to science. The campaign became one of broad public service, the performance of a hitherto forgotten duty to consumers, an obligation for the sake of public health, and a vindication of scientific principles. A fresh fruit and vegetable "protective" fund was raised to finance the work of compiling research findings already in the literature which bore upon the necessity for fresh fruits and vegetables in the diet.

New research was also to be instituted. This was to demonstrate that the freezing process, or certainly the processing of the material before freezing, destroyed the nutritive value of fresh fruits and vegetables. For physicians had recommended only "fresh" and never "frozen" or "frosted" fruits and vegetables—as is very natural since the latter are quite a new development. Science therefore was said to be on the side of fresh fruits and vegetables, though of course new research was contemplated to prove this absolutely.

The fact was brought out in the propaganda that frozen products are not truly "fresh" and should not be so regarded legally. For they have been processed before freezing; they have been soaked in salt water, bleached or blanched with lye, steamed, artificially colored, the ferments have been destroyed, the vitamins have been injured, the mineral salts have been lost. "The fresh, natural products are, by reliable medical authorities, declared to be more healthful and beneficial." The consumer must be protected.

We read: "Research and investigation show that we have the right, from a scientific basis, to advertise to the consumer that fresh fruits and vegetables are the best for the human diet." Then the propaganda became somewhat less opaque. Efforts must be made, it was said, to build up the natural resistance of Americans to something new. Americans must be kept in the habit of eating fresh foods, never frozen foods. The frozen food habit must never grip them as the tin-canned food habit had.

But the basic fact was overlooked that the "fresh" fruits and vegetables usually reached the housewife in an aged, infirm, and withered condition. What is more, the average American housewife can very readily destroy more of the nutritive value of foods by her own slap-dash kitchen methods of preparation than commercial processors are ever likely to destroy and long remain in business.

Scientists as Propagandists

WHEN A SCIENTIST engaged in a research project makes a new finding of importance which is not exactly in line with the project as originally expounded in a program and so financed, he heads for trouble. The new finding may prove more important scientifically than the entire old project as formulated. It is imperative that it be followed up, but there is no way of making it appear "practical" to legislators or other sponsors. Hence the old project is reformulated in such terms that money can be procured really to finance a new project. Camouflage, diplomacy, and a certain amount of gentle misleading are inevitable.

We ordinarily regard as "propaganda" only that sort of advocacy which tends to influence people to accomplish what we regard as bad ends. Hence research scientists probably do not recognize as propaganda the means they use to bolster up scientific projects by properly slanted description and exposition, or the efforts they sometimes make to get the general public to accept the results of scientific investigation. On the other hand, we readily recognize propaganda in fields wherein we have little or no emotional interest.

Propaganda forms an integral part of scientific endeavor from start to finish, as we have seen. It is probably ineradicable so long as human beings remain about what they are, our commercial system remains what it is, our system of education is not modernized, and present methods of financing research continue. But it can be recognized as such by those with a bit of training and, somewhere along the line in our education, we

should be exposed to sufficient training to distinguish between fact and fancy, and to locate and use original sources which are authoritative.

It should be a very distinct and important function of our huge and expensive educational system to enable future members of the general public to recognize propaganda by its marked characteristics, and to make due allowance for it, or to ignore it as necessity dictated in specific instances. This cannot be too strongly emphasized. Even our higher institutions of learning tend too much to teach facts and truths as if they were final, instead of general principles and methods involved in finding out a dynamic truth which is always in process of change—ever becoming, never finally in being.

There is a certain historical value in knowing what science considered true in George Washington's day. But that is not of great practical value to an individual in the world of today. Neither is the solid, final truth of four or six or eight years past much good to a person when he gets out into the world today. What he needs is a training that will provide him with a method of sifting statements, consulting authorities, comprehending the processes of verification, and finding out what is objectively true for today, and what is propaganda issued for ulterior motives.

Not a great deal can be done to reduce the amount of propaganda in science and the abuse of science by propaganda until our educational system is modernized in this respect. That means until it gives special training to all in what facts are verifiable and how to verify them. The effort to inject this sort of teaching into our educational system is a first step toward regeneration.

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