SCIENCE.

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COMMENT AND CRITICISM.

THE INCREASED ATTENTION which is at present directed to artificial butter and its mixtures with dairy butter, and which has been aroused by the attempt of the dairy interest to secure national legislation to restrict the manufacture of oleomargarine and similar substances, makes a recent report of the Imperial health office at Berlin of great interest to the scientific and general public. The inquiry was undertaken at the demand of the government for the discovery of a butter substitute which should, through its cheapness and better keeping-qualities, prove desirable for the navy and the poorer classes. From a sanitary point of view, the report considers that the butter substitutes found in the market are harmless. In all the factories investigated the great cleanliness and care used seemed to make the manufactured article more appetizing than many dairy butters. It is, however, granted, that, when improperly prepared from fats of uncertain or unhealthy origin, there may be danger of the communication of disease; and it is not always possible to tell whether a fat is from a healthy source or not. Disease, it is true, may be communicated through the milk of an infected animal, but such a condition in a living animal is more readily detected. As the production of oleo-oil increases, the demand will exceed the supply, and compel the use of fat from doubtful sources. This, perhaps, already occurs in some cases. There are records of the discovery of bacteria and parasites in some butter substitutes, and the question arises whether the heat used at any time during the process of manufacture is sufficient to kill them. Low temperatures are the rule in most factories, and it appears that the possibility of injury to health from this source is not excluded. The substitutes can also contain ingredients which may prove injurious by loading down the intestines with material of no nutritive value. Soapstone-powder has been thus used for the purpose of giving butter additional weight. Coloring is only objectionable when poisonous dyes are used, but the same objections apply to the coloring of dairy butters as of substitutes. Aside from these injurious contaminations, the question of the sanitary quality of artificial butters must be decided by their relative nutritive value and digestibility as compared with the natural articles. This question, the report considers, is not yet settled from a scientific stand-point.

The conclusions derived from the investigations of this subject are stated as follows: "1. Artificial butter prepared from the fat of healthy animals, aside from a perhaps somewhat smaller digestibility in comparison with milk-butter, furnishes no occasion for the acceptation that it can act injuriously on human health; 2. It is possible that a part of the artificial butter found in the trade is prepared from such material, and by such methods of manufacture, as would not exclude, with certainty, the danger of the communication to human beings of diseases which can be produced by vegetable organisms or by animal parasites; 3. It is possible that some artificial butter is prepared from nauseous materials." It is therefore necessary that there should be strict regulation of the commerce in this article, although at present the means of bringing this about are doubtful. The methods of distinguishing between natural and artificial butters are reviewed at great length as being the basis upon which any regulation of the industry must be founded. The perfection of the recent processes of manufacture are such that these substances cannot, in most cases, be distinguished from each other by their external appearance, or by the senses in any way, without the aid of physical or chemical investigation. Of the physical methods which have been commonly applied, the report refers to those depending on the determination of the melting-points of the various fats, the specific gravity at certain temperatures, the appearance under the microscope, the examination with the refractometer, and a new method of Professor Mayer's. Almost all of these are considered to be of value only within certain narrow limits, as mixtures of fats and oils are found which correspond closely to pure butter. For the practical dairyman, the determination with the areometer, of the specific gravity of the fat melted at 100° C., is regarded as the most available test. While the test is not entirely satisfactory, and cannot com-

pare with those of a chemical character, it is apparently the only one which is available for use outside the laboratory. The differences in the specific gravities of different fats, which furnish the basis for distinguishing them, seem to be hardly great enough to detect mixtures of small amounts of oleo fat or oils with dairy butter.

THE REPORTS that announced the suicide of the King of Bavaria, at the same time brought the news of a sad loss to science. The physician of the king, Dr. Gudden, who lost his life in the attempt to save that of his charge, was one of the most noted authorities in the sphere of nervous and mental diseases. He has also been at the head of a laboratory in which investigations of the fine anatomy of the brain, spinal cord, and sense-organs have been carried on. He has given his name to a matter of studying the connections of the nervous system which is as ingenious as it has proved fruitful of results. Gudden's method consists in extirpating a sense-organ or other part of an animal when young, and then allowing the animal to grow up. At death the animal is examined, and the fibres which have failed to develop will thus be marked out as the paths of connection between the extirpated sense-organ and the brain-centre. For many years Dr. Gudden has been working at the problem, What is the mode of connection between the retina and the brain? His results are not yet before the public, but the great care and patience which always characterize his work will surely make them valuable. His loss in this difficult department of anatomy and pathology is a very serious one indeed.

ASPECTS OF THE ECONOMIC DISCUSSION.

WITHIN the past two months *Science* has contained three extended articles, in which, in compliance with the invitation of the editor, several distinguished members of the so-called 'new school' of economists have undertaken to set forth their principles. In compliance with a like invitation, I now present my views upon the aspect which the discussion has assumed.

If I rightly understand the case, the primary object of the discussion was to afford the representatives of the new school an opportunity to set forth such peculiarities of their tenets as might justify the appellation which they claim, and at the same time afford the student an opportunity to compare their principles with those of the school from which they are supposed to diverge. The main point in which the new school is supposed to differ from the other, is that it looks with more favor upon government intervention in the processes of industry and trade; and it might naturally have been expected that its representatives would define their position upon the questions here involved.

In this respect the outcome of the discussion is disappointing. After a careful study of the three papers already published, which bear directly on the subject, I am unable to form any clear conception of the ground taken by the writers on these fundamental questions. The form in which the question first presents itself to my mind is this: the familiar terms 'government intervention' and 'state interference' are themselves so vague, that in discussing them we must exactly define the sense we attach to them. There are two or three forms of state intervention. And it may be that one form is good, and another bad; that one form will inevitably tend to increase with the progress of society, and another to diminish. Again, we must draw a distinction between intervention in purely economic affairs for purely economic objects, and intervention for other and wider purposes, such as the promotion of education, the public morals, and the public health.

These definitions would only have been preliminary to the main object, which is to define to what extent state intervention can with advantage be carried. There can be no reasonable discussion over such vague propositions as, 'the state ought to interfere,' or 'the state ought not to interfere,' because every one is agreed that the state ought to interfere where it is really necessary to the public welfare, and that it ought not to interfere when it will not promote the public welfare by so doing. Again, when the state does intervene, it must intervene in the right way; and the question whether any particular way is or is not the right one must remain open until it is examined. The careful reader of the discussion will see that no progress whatever is made, in the articles alluded to, towards answering these fundamental questions: I am therefore obliged to consider in a general way such of the points brought forward as seem worthy of comment.

Professor Seligman's paper, on the changeable character of the tenets of political economy from age to age, seems to me a very admirable one. It shows very clearly the relations of economic theory to economic practice at various epochs in the world's history. It implies that the orthodox economic principles of the first half of the present century must pass away, as others have done, with changes in the forms of industry. While I heartily agree with nearly all that he says, when I am