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ADULTERATIONS AND SUBSTITUTIONS.

dozen who do it without knowing. So, too, in regard to those who use oleomargarine instead of dairy butter, taking purpose. the former knowingly on account of its lower price, or bebusiness. The manufacturer may not deceive the large conveyed without a wire along a line of light. dealer, who is supposed, equally with himself, to be an expert; from the large dealer to the retailer, and from the lat- producing speech by the action of light is the conception ter to the consumer, however, the opportunities for decep of what Mr. Bell terms an undulatory beam of light in tion, without the commission of any fraud in the eye of the contradistinction to an interrupted beam; meaning by the law, are wonderfully increased.

Perhaps one of the most successful of the comparatively rapid changes of intensity. new adulterations is that of the use of glucose, made from The apparatus used to give the required undulatory chatle sweetening power. Mr. R. C. Kedzie, the president of parallel by means of another lens. the Michigan State Board of Health, in a recent report, The beam proceeding from the transmitter is received at of glucose from commercial sugars," and adds: "In the light of a kerosene lamp. common candies, where the crystalline form is purposely The rapid interruption of the beam of light by a perfo-

we come to the sophistication of drugs, and all that class of made at the transmitter. articles known to our materia medica, where a single in- The importance of these investigations it is impossible now drugs, to determine how general may be the adulteration, be serviceable. proceeds to set forth mainly such facts as are recorded in 'Another result of Mr. Bell's researches in this connection examiner" for the port of New York, at which most of the glass. importations had been made, had occasion, during the first ten months, "to reject about 90,000 pounds of drugs, such as rhubarb, opium, jalap, gamboge, senna, yellow bark, iodine, croton oil, sarsaparilla, etc., while from 1848 to 1857 the same examiner rejected over 900,000 pounds of unsafe, adulterated, and improper drugs and medicines." It was at once demonstrated that the law had been of great benefit, for the quantity of drugs rejected within a short time after the appointment of the examiner was much larger than a brief period later, and continued to diminish for several not as effective as it should be, because the examiners are not always appointed solely with reference to their fitness for the office.

The National Board of Health have no remedy to recommend for the present state of things, but from the printing of their report, and the diffusion of such information as is here presented, much good may ultimately result. The National Government can exercise more care, or make more stringent regulations if that be necessary, to prevent importations of inferior or adulterated drugs, but what seems even more necessary than this is uniform action by the various State Legislatures to more effectually control the manufacture and the dealings in a class of goods where the detection of inferiority or deleterious adulterations are generally so difficult, and where any fraud is likely to have a direct effect on the health of the community.

THE PHOTOPHONE.

nium. At the recent meeting of the American Science People who like to mix chiccory with their coffee should Association in Boston, Mr. Bell read a paper describing undoubtedly be allowed to do so, although, for one who at length his experiments in the production and reproknowingly uses coffee so adulterated, probably there are a duction of sound by light, and the invention by Mr. Sumner Tainter and himself of an instrument for the

The influence of light upon the electric conducting cause a good article of butter may not be obtainable. There power of selenium is well known. Mr. Bell found the are many other deteriorations, adulterations, and substitu- electric resistance of same selenium cells of peculiar contions which are also allowable, if not even entirely harm-struction only one-fifteenth as much in the light as in the less, provided, as between manufacturer, dealer, and con- dark. It occurred to him that all the audible effects obsumer, there be a correct understanding as to the article tained in the telephone by variation of the electric curdealt in, and no attempt at deception is practiced. The rent by sound waves, could also be produced by variadifficulty is that deception in some form, or at some stage, tions of light acting upon selenium; and that with suitseems to be an invariable accompaniment of this kind of able transmitting and receiving apparatus voices might be

former a beam that shines continuously, but is subject to

corn, for the adulteration of sugar and sirup supposed to be racter to light consists of a flexible mirror of silvered mica made from the sugar cane. Considerable prominence has or thin glass. The speaker's voice is directed against the been given to this matter on account of a trial which took back of this mirror, as against the diaphragm of a telephone, place in Buffalo in July, the suit growing out of a differ- and the light reflected from it is thereby thrown into correence as to the ownership of stock in a company which had sponding undulations. In his experiments, chiefly with made immense profits out of the business. Glucose, or sunlight, Mr. Bell concentrates upon the diaphragm mirror starch sugar, is not necessarily harmful, but it has very lit a beam of light, which, after reflection, is again rendered

gives a list of seventeen table sirups he had examined, of a distant station upon a parabolic reflector, in the center of which only two were less than half glucose, while most of which is a sensitive selenium cell connected in a local cirthem were more than three-quarters, and four were all glu-cuit with a battery and telephone. In a recent experiment, cose. One gallon of sirup from cane sugar is estimated to Mr. Bell's associate operated the transmitting instrument, have the sweetening power of 4 17 gallons of glucose sirup, which was placed on the top of the Franklin school house, in The writer concludes, however, that there is comparatively Washington, about eight hundred feet distant from the relittle glucose in "granulated" and "crushed" sugars, of ceiver, placed in a window of Mr. Bell's laboratory. which he had examined many samples, although he found Through this distance messages were distinctly conveyed by it easily in many samples of light brown sugars. He says: means of light. In his laboratory experiments Mr. Bell "The existence of clean, well-defined, non-coherent crys-finds that articulate speech can be transmitted and reprotals, free from floury dust, is good evidence of the absence duced by the light of an oxyhydrogen lamp, and even by the

avoided as far as possible, glucose is often used in large rated disk gives rise to musical tones, siren fashion. With this apparatus silent motion produces sound, loud musical The case assumes a much graver aspect, however, when tones being emitted from the receiver when no sound is

stance of adulteration or substitution may put health or life to estimate. That the photophone can practically take the in jeopardy. The National Board of Health has, therefore, place of the telephone is not likely, though it is likely to done well, in the absence of any yellow fever damage this work radical changes in military and other signaling opeyear, to devote some attention to this subject, and they have rations. The heliograph, which has proved so useful accordingly issued a pamphlet in relation thereto, embody- in recent campaigns in the Afghan country and elsewhere, ing a report furnished by Mr. C. Lewis Diehl, on "Deterio- can now be made to talk orally yet silently over the heads rations, Adulterations, and Substitutions of Drugs." The of an enemy or across impassable streams or other low writer, after mentioning the practical difficulties attending barriers. For rapid communication between distant explorthe collection of specific information in regard to particular ing or surveying stations, the photophone also promises to

the current literature of the last twenty-five or thirty years, is the discovery that many other substances are sensitive to most of it coming within the published proceedings of the light. He has found this property in gold, silver, platinum, American Pharmaceutical Association. Previous to 1848 iron, steel, brass, copper, zinc, lead, antimony, German sillarge importations of adulterated and inferior drugs were ver, Jenkins' metal, Babbitt's metal, ivory, celluloid, gutta thrown on our market, but in that year Congress passed a percha, hard rubber, soft vulcanized rubber, paper, parchlaw to regulate such importations, and designed to exclude ment, wood, mica, and silvered glass. The only substances inferior and adulterated drugs. Under this law the "special found insensible to light are carbon and thin microscopic

AN ASTRONOMICAL DISCOVERY.

Professor E. C. Pickering, director of the Harvard Observatory, lately made a discovery which is regarded as one of the most important of the century in stellar physics. In the ordinary telescope a star appears as a point of light, brighter, but not larger than when looked at with the naked eye. Prof. Pickering finds that, on placing a prism between the object glass and the eyepiece of his telescope, the light years. The record of drugs rejected is not now kept, but of a star is drawn out into a continuous band. When, howthe same law is in force, although it is complained that it is nebula, the light is collected into a star-like point without any band, enabling the astronomer to distinguish instantly between a star and a planetary nebula. This principle has already enabled Prof. Pickering to discover several planetary nebulæ. On Thursday evening, August 26, an object was observed which presented the appearance of two starlike points within the band in the modified telescope. It is different from anything heretofore observed in the telescope, and is regarded as an important object for investigation.

HOW ARE THE OIL TANKS SET ON FIRE BY THE LIGHTNING ?

Again we have to record the destructive effects of lightning in the Bradford, Pa., oil regions. On the 28th of August, at 8:30 P.M., one of the 25,000 barrel oil tanks of the United Pipe Line Company, near State Line and Tarport, was set on fire by electricity and burned; also four smaller tanks on the West Branch near Bradford. At one In May, 1878, Mr. Alexander Graham Bell, well known in time there was danger of a gigantic conflagration, as there connection with the telephone, announced before a scientific were some twenty large tanks not far from the burning tank society in London his belief that it would be possible to hear of the Pipe Company. By firing cannon shot into the tank a shadow by interrupting the action of light upon sele its contents were run out and the adjacent property saved.