4th. If it be an imitation of, or sold under the name of another article.

B. In the case of drugs—

1st If when retailed for medicinal purposes, under a name recognized by the British Pharmacopœia, it be not equal in strength and purity to the standard laid down in that work.

2nd If, when sold under a name not recognized by the British Pharmacopœia, it differ materially from the standard laid down in approved works on Materia Medica, or the professed standard under which it is sold.

LIMITS.

Milk shall contain not less than 9.0. per cent. by weight of mil solids, not fat, and not less than 2.5 pr. ct. of butter fat

Skim Milk shall contain not less than 9. 0 pr. ct. of milk solids.

Butter shall contain not less than 30.0 per cent. of butter fat

Tea shall contain not more than 8.0 per cent. of mineral matter, calculated on the tea dried at 100° C., of which at least 3·0 per cent shall be soluble in water, and the tea, *as sold*, shall yield at least 30.0 per cent. of extract.

Cocoa shall contain at least 20.0 per cent. of cocoa fat.

Vinegar shall contain not less than 3 0 per cent. of acetic acid.

These results of the deliberations of a scientific body of practical analysts, will be an invaluable guide to the more isolated chemists, who enjoy a less extensive experience; and the publication from the same source of practicable processes will bring about more uniform results, and increase the confidence of the public in all such determinations.

With such rich experience, and such able guides, the Analysts of this Dominion will commence their labours without fear or favour, determined "nothing to extenuate, nor aught set down in malice." As public servants, their only desire will be for the public benefit, and although, in British experience, the progress has been slow, and the success partial, still they trust that starting on the vantage ground of the knowledge already obtained, they may in due time contribute their full record of painstaking and conscientious labour for the public good. By the aid of this law it is hoped, not only to protect the public against fraud, but also to aid society in its desire to promote sanitary science.

TYNDALL ON SOUND.

LECTURE BEFORE THE ROYAL INSTITUTION.

Professor Tyndall began by saying that in the philosophy of Locke an idea was defined as a mental picture, and in all his (Professor Tyndall's) teaching of science he had always attempted to give clear ideas—resting upon a physical basis—of the phenomena presented, avoiding all vagueness of phraseology, and in pursuance of this plan he would show a few experimental facts as a basis from which to start. He then took a large glass vessel filled with perfectly invisible carbonic acid gas, and held it between the electric lamp and the brilliantly illuminated screen, so that the large shadow of the glass vessel was seen upon the screen. Upon tilting the vessel the heavy carbonic acid gas began to pour out of it, and as it refracted light more than air, it became visible upon the screen as a falling stream full of waves. His assistant next began to blow through some invisible vapour of sulphuric ether placed between the screen and the lamp, and as the invisible mixed breath and vapour issued from the tube the stream was rendered visible by its unequal refraction of the rays of light. The same effect was produced by means of the hot gases from a burning candle placed between the electric lamp and the screen These facts, he said, would serve to give a physical basis for their ideas, by showing that in a perfectly transparent atmosphere there might be invisible layers, having an influence of their own.

If a wave of sound entered an invisible cloud of carbonic acid gas, then the velocity of the wave would be reduced from 11-20ft. to 900ft. per second, but on leaving the gas and re-entering the common air it would move with its original speed At every change of velocity a certain portion of the sound would be sent back as an echo, thus on first reaching a layer of carbonic acid a part of the sound would be reflected, and, after passing through the layer and reaching the other side, a further portion would be sent back as another echo; if there were many alternate layers of air and carbonic acid gas this action might take place so often as to quench an entire wave of sound and to dissipate it in echoes. Professor Tyndall here called attention to a small square wooden tube, into the air of which, he said, he could introduce at will seven vertical sheets of carbonic acid gas through pipes. One of the sensitive flames, which contracted at a shrill sound, was placed at one end of the tube, and a whistle continuously blown by a bellows was placed at the other. When the tube contained air only the sound passed freely and contracted the flame; when he let seven sheets of carbonic acid gas enter the tube, they broke up the sound into echoes, so that its action upon the flame was cut off, being intercepted by layers of invisible gas. He then showed that heated air would have the same effect, by doing away with the carbonic acid, and placing four gas flames below the tube, so as to heat it in four places, and produce four layers of heated air inside. Layers of unequally heated air prevented the sound from passing through the tube, and broke it up into echoes. The lecturer here remarked, "How could it be proved these layers produced echoes?" If they did so, of course he ought to be able to prove it experimentally, so some time since he asked his assistant to solve the problem practically, and Mr. Cotterill had done so. His plan was to take a large hot flame from a bat-swing burner, which had the power of reflecting sound, for the hotter the flame the greater was the reflection, and he placed this flame in a position to throw back the sound, which it actually did, as proved by the contraction of the sensitive flame.

Strange to say, the flame could reflect sound much better than calico, muslin, and other woven fabrics. Professor Tyndall here borrowed a little boy's handkerchief, and showed that it would not cut off the sound even when folded four times; neither would green baize, nor felt ¼in. thick—so thick that it would entirely cut off the light of the noonday sun. Two hundred layers of muslin in a square pad had but a feeble power in cutting off sound. The lecturer remarked that this was because the air was continuous inside the fabrics. On wetting the handkerchief with water, so as to prevent continuity of the air, a single layer of the wet handkerchief cut off the sound. He remarked that after seeing these facts the listeners would be quite prepared to understand that a heavy snow storm would have little power in intercepting sound, whereas loud noises might be quickly quenched on a clear day, supposing the air to be heated unequally in different places.

Professor Tyndall narrated how in one of his laboratory experiments he had placed fifteen layers of calico, each an inch or two behind the other, and in front of one of his sensitive flames He discovered that the sound from the whistle would pass through the whole of the fifteen layers, and that each layer would reflect a portion of it so as to act upon the sensitive flame, thus in passing and returning through the fifteen layers, the sound passed through thirty layers in all.

The lecturer also said that the experiments recently made at the South Foreland were to the honour of the Trinity House, the Board of Trade, and to the Government of this country for they had proved to be of practical importance, and had solved scientific questions which had been in a state of confusion for a century and a-half. Some of the experiments had consisted in the firing of guns and noting to what distance the sound would travel, also various facts were recorded connected with the echoes. Even in the most cloudless and fine weather the aerial echoes were always plentiful.

In 1822, a commission of the *bureau des longitudes* was instituted at the request of La Place to determine the velocity of sound Two stations were selected outside Paris, and guns were fired at each station. The time of the flash of each gun and the time of the arrival of each sound were noted by exceedingly careful observers, among whom were Arago, Gay Lussac, Humboldt, and other trustworthy observers. To their surprise they discovered that the sound travelled more rapidly in one direction than in the other, and the wind had nothing to do with this effect, for the very slight wind then blowing was in opposition to the direction in which the sound travelled fastest. Arago had the courage to say he could not explain this fact. He once or twice heard echoes, but then clouds were about, so he thought the echoes might be due to the presence of clouds.

Professor Tyndall here took a large glass cabinet about the size of a watchman's box, and he caused the sound from the whistle to enter it on one side, and to depress the sensitive