

A PURE MILK SUPPLY.

THE importance of a supply of pure and wholesome milk can hardly be exaggerated, and during the last few years much has been done to ensure this by the education of the producer, and by the formulation of regulations by the health authorities. Contamination may take place at four stages:— (1) the cow may be unhealthy, *e.g.* tuberculous; (2) the condition of the farm and milkers and the methods employed may be unsatisfactory; (3) contamination may take place in transit; or (4) during or after sale to the consumer.

In dealing with some phases of this subject, a practical acquaintance with trade conditions is necessary, or impracticable regulations may be imposed. Thus, in a paper read by Mr. Primrose McConnell before the Royal Society of Arts,<sup>1</sup> reference was made to the exaggerated ideas of some sanitarians as to the cubic and floor spaces required in the byres, and, as the author remarked, if the ventilation is properly arranged for, the mere air-space in a shed is a subordinate matter.

The arm-chair sanitarian is apt to forget that one milking has to be done in the early hours of the morning—in winter in dark and cold—that disinfectants, clean smocks, and hot water may be unattainable luxuries, that in many cases all that can be hoped for is the promulgation of the doctrine of general cleanliness, and that to insist on liberal air-space and various structural conditions in the cowsheds may mean an outlay which will render the production of the milk too costly to give an adequate return to the farmer. Far be it from the writer to suggest that ideal conditions should not be formulated and put into practice whenever possible, but in all cases the regulations should be drawn up with the help of trade experts, and with a due regard to the conditions of the district.

No doubt the conditions of supply which formerly obtained, and perhaps to some extent still exist, in some of the smaller farms are much to be deprecated, but a great deal has been done, particularly by the large dairy companies of the metropolis, to remedy this. The problem of transit is still one that requires much attention; the ordinary milk churn is a dirt and dust trap by which much contamination may be introduced into the milk, and refrigerator vans need to be provided by the railway companies. The ordinary method of serving milk with a dipper, and the manner in which milk in bowls is allowed to stand on the counter by the smaller vendors amid a heterogeneous collection of other goods, are in urgent need of alteration.

To some statements made by Mr. McConnell in the paper referred to the writer would take exception. Thus, the existence of large numbers of microbes in milk, provided none was definitely pathogenic, was considered to be of no importance. But large numbers of microbes generally indicate dirty production, which in its turn facilitates the entrance of harmful bacteria. Moreover, milk swarming with microbes may in some cases produce gastro-intestinal disturbance. Tuberculin was considered to be of no value, but veterinary authorities in all countries are unanimous in regarding it as of the greatest value in the detection of tuberculosis. The careful work of the commissioners of the Royal Commission on Tuberculosis on the transmission of bovine tuberculosis to man cannot be summarily dismissed by the statement that "their far-fetched experiments and tests have not proved it to the satisfaction of many people who understand the matter just as well as they do."

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<sup>1</sup> "London Milk Supply from a Farmer's Point of View" (Journ. Roy. Soc. of Arts, December 18, 1908, p. 83).

THE DENSITY OF GASES IN RELATION TO THE ATOMIC WEIGHT OF NITROGEN.

THE fourth and last instalment of the current volume of the well-known Geneva Society's Transactions, referred to below,<sup>1</sup> has a special interest for the chemist and physicist from the fact that it is wholly made up of a series of communications from the laboratory of chemical physics of the University of Geneva under the direction of Prof. Ph. A. Guye. The memoirs, five in number, deal with experimental researches on the physicochemical properties of certain gases in relation to the revision of the atomic weight of nitrogen, a problem which has occupied Prof. Guye and his collaborators for some years past. The greater number of the main results have already been seen in abstract in many serial publications. The work before us contains the full memoirs, which are illustrated by carefully executed drawings of the apparatus employed.

The respective titles are:—

- I. "Détermination des Densités des Gaz anhydride carbonique, Ammoniac et Protoxide d'Azote par la Méthode du Volumètre." Ph. A. Guye et Al. Pintza.
- Annexe I.: "Contrôle des Densités de l'Oxygène et de l'Anhydride sulfureux." A. Jaquerod et Al. Pintza.
- Annexe II.: "Essai sur la Détermination du Poids atomique de l'Azote par l'Analyse en Volume du Gaz ammoniac." Ph. A. Guye et Al. Pintza.
- II. "Détermination de la Densité de l'Oxyde Azotique par la Méthode des Ballons." Ph. A. Guye et Ch. Davila.
- Annexe: "Densité du Gaz acide chlorhydrique." Ph. A. Guye et G. Ter Gazarian.
- III. "Sur la Compressibilité de quelques Gaz à O audessous de l'Atmosphère." A. Jaquerod et O. Scheuer.
- IV. "Détermination des Pressions et Températures critiques de quelques Gaz." E. Briner.
- V. "Résumé général." Ph. A. Guye.

The main results may be thus stated:—

The weights of the normal litre, that is, the weights of a litre of the respective gases at 0°, under a pressure of 1 atmosphere at sea level, under the latitude of 45°, are as follows:—

	Grams
Carbon dioxide ... ..	1.9768
Ammonia ... ..	0.7708
Nitrous oxide ... ..	1.9777
Oxygen ... ..	1.4292
Sulphur dioxide... ..	2.9266
Nitric oxide ... ..	1.3402
Hydrogen chloride ... ..	1.6398

For the values of compressibility and critical constants of these gases, as well as of those of certain methyl derivatives, we must refer to the original memoirs.

The bearing of the observations so far as they are applicable to the question of the atomic weight of nitrogen is discussed by Prof. Guye in an introductory communication. The result is to show that Stas's value of 14.04 is probably too high, as has been shown independently by Gray. The most probable value is 14.01, a number already adopted by the International Committee on Atomic Weights in its last report.

EDUCATION AND EMPLOYMENT.

WE are glad to see that attention is being again directed to problems of the relation between education and national welfare. In his address as president of the Association of Technical Institutions, last year, Sir Norman Lockyer referred to the deplorable national wastage that goes on after children leave the primary school, and pointed out that by permitting the half-time system the State is

<sup>1</sup> "Mémoires de la Société de Physique et d'Histoire naturelle de Genève," vol. xxxv., Fascicule 4, December. (Genève: Georg et Cie., 1908.)