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Physical Science

A SLIGHTED PAGE IN FIRST YEAR COLLEGE CHEMISTRY

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ABSTRACT

According to Avogadro's Law equal volumes of gases, at the same conditions of temperature and pressure, contain the same number of molecules. Let us use the following gases for our illustration.

Molecules	H_2	O_2	Cl_2	CO_2	CH_4	NH_3	C_2H_6
Molecular Wts.	2	32	71	44	16	17	30
Density	1	16	35.5	22	8	8.5	15
Wt. of 1 liter	.09 g.	1.44	3.19	1.98	0.72	1.35	0.765
G.M.V.	2	32	71	44	16	17	30
	.09	1.44	3.19	1.98	0.72	0.765	1.35
	↓	↓	↓	↓	↓	↓	↓
	22.41	22.4	22.4	22.4	22.4	22.4	22.4

In general $d \times 2 = \text{Mol. Wt.}$

Wt. of 1 liter = $d \times 0.09$ g.

$$GMV = \frac{MW}{\text{Wt 1 liter}} = \frac{d \times 2}{d \times .09} = \frac{2}{.09} = 22.4 \text{ liters}$$

Given a gas of which we have no information
Analysis shows it to have 75% C and 25% H.

$$\frac{75\%}{12} = 6.25$$

$$\frac{25\%}{1} = 25$$

$$\frac{25}{6.25} = 4$$

$$1.008$$

\therefore 1:4 or formula is CH_4

$$MW = 16$$

$$\text{But for } CH_4, \frac{MW}{2} = 8 = d$$

$$\text{and 1 liter} = d \times .09 \text{ g. or } 0.72 \text{ g. wt. 1 liter}$$

$$\text{Again } MW = 22.4 \text{ l} \times 0.72 = 16.$$

MICROWAVE DIATHERMY

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ABSTRACT

Application of heat to various parts of the body is a familiar and old method of medical treatment. When it was learned that alternating currents above a certain frequency did not stimulate living tissues but, instead, produced a beneficial type of heating, the techniques of conventional diathermy and, later, short-wave diathermy became a part of medical technology. Scientific studies of these forms of diathermy showed that electrical currents of even higher frequencies would be desirable for supplying additional heat. These higher frequencies would have certain advantages over the short-wave and conventional diathermy because they could be focused more easily and directed at those areas where the heat was needed. It was not until microwave generators for use in radar were developed that outputs adequate for medical diathermy were available. Through the cooperation of the Raytheon Manufacturing Company we have procured the equipment necessary for studying the heating effects of microwaves. Any desired temperature may be obtained in certain living tissues. Caution must be taken when heating with microwaves in order to prevent the production of excessive temperatures.

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BINOCULAR SPACE PERCEPTION

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It has been estimated that over 80 per cent of our immediate contact with the world of objects about us comes through the sense of vision. So automatic are the visual processes that the majority of us are actually unaware of the eyes, unless trouble sets in and then we may become over-conscious of their existence.

The visual processes, which include not only the eye as a camera, but the neurological and the psychological systems by which light stimuli from objects in space finally emerge as an experience, are usually considered in the two categories: (1) The sensory aspects, which include the light sense and the space sense, and (2) the motor or muscular aspects, by which the eyes are coordinated and directed to the object of attention. In the visual act, all of these factors are operating.

In the space sense are the categories of direction and distance discrimination. We will be interested here in distance localization. We distinguish between relative distance or depth—the visual dis-