milliliter being larger than the cubic centimeter by twenty-seven parts in a million.

It is a peculiar fact that although the one-thousandth part of the liter is the unit that is almost universally employed in measurements of volume and density of liquids, it is most often designated as the "cubic centimeter" or "cc" instead of by its correct designation "milliliter" or "ml." While the two units are so nearly equal as to be interchangeable for many purposes, yet the difference between them is sufficient to be very troublesome at times.

The only safe procedure is always to make sure which unit is being employed and then to designate it correctly. The preferable designation is "$cm^3$" for the cubic centimeter and "ml" (not "cc") for the milliliter.

It is unfortunate that the kilogram should not have been made a little lighter or the meter a little longer in order that the cubic decimeter and liter might have been equal and the original plan of interrelation of the units carried into effect.

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## THE PASSING OF THE CIRCUIT SYSTEM OF COLLECTING WEATHER REPORTS

ON April 1, 1928, the Western Union Telegraph Company abandoned the circuit system, inaugurated in 1871 and used continuously since in collecting the twice-daily weather-reports from points in the United States and Canada.

A new and more flexible system was installed which obviated the necessity of withdrawing twice daily about 15,000 miles of wire from the usual commercial channels, for the exclusive use of the weather bureau. Two centers of collection and distribution, *viz.*, Chicago and New York, are a part of the new system. The largest factor in making the change was the very general use of automatic sending- and receiving-apparatus by the telegraph company in recent years whereby several channels of communication both ways are possible on a single wire.

The old system required hand operation, and traffic could flow but one way at a time.

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## THE ABNORMAL SPECIFIC HEAT OF A RAREFIED GAS AT A LOW TEMPERATURE, AND THE COSMIC RADIATION

IN a paper that will appear in the May number of the *Journal of the Franklin Institute* it is shown thermodynamically that a gas at a very small molecular concentration, at which it is largely or altogether in the atomic state, near the absolute zero of temperature, has an abnormally large specific heat which may amount to thousands of calories per gram. This is due to three separate effects, each of which need not always occur. One of them is intimately connected with the remarkable result also obtained thermodynamically that the internal heat of evaporation of all substances is zero at the absolute zero of temperature. This result was obtained by means of the result deduced previously by the writer[1] that the adiabatic of zero entropy corresponds to zero absolute temperature. It was also obtained independently of considerations of the zero of entropy, thus incidentally furnishing welcome evidence from another direction of the truth of the foregoing result.

These abnormally large specific heats—they are likely to be specially large in the case of gaseous C, $H_2$, $O_2$ and $N_2$—are bound to be attended by great changes in the electronic configuration of the atoms with decrease of temperature, during which some of the electrons are likely to fall through very high potentials. This would give rise to an electro-magnetic radiation some of which might conceivably be of greater penetrating power than the $\gamma$ radiation of radium. The cosmic radiation which appears to come from interstellar space might well be caused in this way. For no doubt this space contains various gases, especially the above, at an extremely low molecular concentration, whose temperature is near the absolute zero and still decreasing.

Since the air in the upper region of the atmosphere is at a low concentration and temperature, it is not improbable that a large part of the cosmic radiation proceeds from this region. If that is so the radiation arriving in a horizontal direction would be larger for a given solid angle than that in a vertical direction, a deduction which could be tested experimentally.

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## SCIENTIFIC APPARATUS AND LABORATORY METHODS

### MACROSCOPICAL DETECTION OF THE MEDULLATED WOOL FIBER

The medullated wool fiber is considered a serious defect in the fleece. In the United States little if any attention has been given the problem of its elimination, possibly because most of the woven fabrics manufactured for clothing purposes in this country

[1] *J. Phys. Chem.*, 31, 940, 1927.