and allowed to attain the room temperature of 25°. The water bath was then heated to 30.1°. The regulator, which had a temperature of 25°, was then immersed in the bath. In 30 seconds from the time of immersion, the thermoregulator automatically operated the relay and cut off the heating current. It is this rapidity of accommodation which makes the vapor-pressure thermoregulator especially suited for temperature control in those cases where no great care is taken to prevent any sudden change of external temperature and where the amount of heat, supplied under the control of the relay and thermoregulator, is in considerable excess of the exact amount required to maintain the bath at the desired temperature.

A gas thermoregulator so constructed as to be independent of atmospheric pressure would have, at room temperature, a maximum sensitiveness of approximately one-tenth that of the saturated ether vapor thermoregulator. This is true when the gas used exerts a pressure of 760 mm. at 0°. Of course, if it were possible to construct a thermoregulator containing a gas under high pressure, a degree of sensitiveness heretofore unattained could be secured. Referring to the PV isothermals of a gas, we see that the vertical distance between two consecutive isothermals, which represents the increase in pressure per degree at constant volume, can be made as large as desired by choosing high pressures and small volumes. The difficulty here, however, and it seems insurmountable, would be to devise a means of confining the gas at such high pressure without the use of a mercury column of huge dimensions.

Summary.

1. The author has devised a form of vapor-pressure thermoregulator unaffected by changes in atmospheric pressure, and utilizing an electrical contact in dry carbon dioxide gas.

2. The thermoregulator is light and easily adjusted, is adapted for use in fluid baths, and is unaffected by motion of the fluid.

3. The rapidity, with which it adjusts itself to changes in the temperature of the bath, makes it especially suitable for the accurate temperature control of the average thermostat.

4. It has an observed sensitiveness of 0.01° to 0.005°.

ALEX. L. FEILD.

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INTERNATIONAL ASSOCIATION OF CHEMICAL SOCIETIES.

The third session of the Council of the International Association of Chemical Societies was held at the Institute Solvay, Brussels, September 19–23, 1913. The meeting was held in Brussels instead of London in acknowledgment of Monsieur Solvay's munificent, unconditioned gift of

Frs. 250,000 to the Association and also because of his bequest founding an International Institute of Chemistry with an endowment of Frs. 1,000,000.

The most important action taken by the Council was as follows:

After discussion of a report by Professor Werner on the investigation of the language difficulty in scientific literature, the committee was requested to report next year on three points:

(1) The Publication of an International Journal of Abstracts in three languages.

(2) The publication of three editions of an International Journal of Abstracts, *viz.*, in English, French, and German.

(3) The publication of an International Journal containing translations in either English, French or German of original papers appearing in the lesser known languages.

Professor Guye reported for the Commission on Abbreviations of the Titles of Scientific Journals and resolutions were adopted looking toward the adoption, if possible, of a uniform set of abbreviations on the basis of the "International Catalogue of Scientific Literature."

The following report of the International Commission for the Unification of Physico-Chemical Symbols was adopted.

In drawing up the list of symbols, the Commission decided to adopt, *as far as possible*, as a basis of notation, the following two principles, namely:

1. Each symbol shall have only one definite signification.

2. Where it appears impossible to avoid using the same letter for different quantities, the symbols shall be distinguished by a letter, added as subscript.

This second principle was also adopted in the case of individual members of a group, *e. g.*, volume, specific volume, molecular volume, critical volume, etc. The Commission, however, recognized that there are practical difficulties in the way of a strict adherence to these principles. Although, therefore, in the list of symbols recommended by the Commission, a given symbol may have more than one signification, the Commission have also suggested alternative symbols which may be used in those cases where confusion may arise. Thus, for example, the Commission recommends that R should be used as the symbol both for the gas constant and for electrical resistance; but that in those cases where there is a possibility of confusion, the alternative symbol R_w may be employed for the latter quantity. The addition of the letter W here recalls the use of this letter for electrical resistance frequently met with in Germany.

In making these suggestions, the Commission took into consideration the symbols proposed by the National Committees of the American, French, and London Chemical Societies, as well as by the Bunsen Gesellschaft, the Ausschuss für Einheiten und Formelzeichen, and the International Electrotechnical Commission. A large measure of agreement already existed between the proposals of these different bodies, but in those cases where there was disagreement, the reasons for the adoption by the Commission of the symbols recommended are stated in the column headed "Remarks."

The Commission decided to recommend the employment of only Greek and Roman characters, and, in the case of the latter, that the letters should be printed in the *italicized* (*sloping*) *form*. The Commission was of opinion that small Roman capitals should not be employed on account of the difficulty of distinguishing them from the ordinary letters.

	Symbols recommended.		
Name of quantity.	Usual symbol.	Alternative symbol to be used in cases where confusion with other symbols may arise.	Remarks.
1. General Physics and Mathematics.			
Acceleration due to gravity	g		
Ångström unit (10^{-10} metre)	$\mathring{A}$		
Area	q		The symbols α, F, and s have been variously suggested. The Commission recommends q (quadrate, Quadrat), as a suitable international symbol.
Base of natural logarithms	e		
Co-ordinates, variables	x, y, z		
Critical quantities: pressure, volume, temperature (Centigrade), temperature (absolute), density	p_c v_c t_c T_c d_c		Recommended in place of Greek letters, in accordance with the general principles adopted by the Commission.
Density (mass per unit volume)	d	D	D may be used, for example, in the differential dD/dt.
Diameter	d		Suggested; not definitely recommended.
Differential sign, total	d		
Differential sign, partial	∂		
Fluidity	ϕ		Suggested; not definitely recommended.
Force	f		
Gas constant per mole	R		
Height	h		Suggested; not definitely recommended.
Increment	Δ		
Length	l		
Mass	m		
Mean free path	λ	λ_f	λ_f may be used in order to distinguish from λ = wave length of light.

Name of quantity.	Symbols recommended. Usual symbol.	Alternative symbol.	Remarks.
1. General Physics and Mathematics—contd.			
Micron (10^{-6} metre)	μ		
Millimicron (10^{-9} metre)	$\mu\mu$		The Commission recognizes that the symbol $\mu\mu$ ($= \mu \times 10^{-3}$) is not strictly logical, but recommends that owing to the universality of its use it should be retained.
Number (of terms, revolutions, etc.); number of molecules	n		
Number of moles	N		
Pressure	p		
Pressure, osmotic	P		
Radius	r		
Ratio of circumference to diameter	π		
Reduced quantities: pressure, volume, temperature, density	p_r v_r T_r d_r		
Summation sign	Σ		
Surface tension	γ	σ	The use of γ is recommended as chief symbol on account of its employment in the classical researches dealing with this subject.
Time	t		
van der Waals' constants	a, b		
Variation sign	δ		
Velocity	u		
Velocity, angular	ω		
Velocity components in three directions	u, v, w		
Viscosity	η		This symbol is recommended as being in accordance with the usage among physicists.
Volume (in general)	v		
Volume, specific	v_s		
Volume, atomic	v_a		
Volume, molecular	v_m		
Weight, as gravitational force	w		
Work	W*		
2. General Chemistry.			
Atomic weight, and gram-atomic weight	A		
Concentration (units not specified)	C		
Equilibrium constant	K		

* The letter A has been adopted as the symbol for "Work" by the Ausschuss für Einheiten und Formelzeichen and by the International Electrotechnical Commission. The latter body has adopted W as an alternative symbol.

Name of quantity.	Symbols recommended. Usual symbol.	Alternative symbol.	Remarks.
2. General Chemistry—contd.			
Mole fraction	x		
Molecular and gram-molecular weight	M		
van't Hoff coefficient	i		
Velocity coefficient	k		
3. Heat and Thermodynamics.			
Energy, in general	E		Suggested; not definitely recommended.
Entropy	Φ		This symbol, used by Willard Gibbs and others, is recommended, since S is adopted for molecular heat.
Intrinsic energy	U		
Latent heat, per gram	l		
Latent heat, per mole	L		
Mechanical equivalent of heat	J		
Molecular heat	S		
Molecular heat at constant pressure	S_p		
Molecular heat at constant volume	S_v		
Quantity of heat	Q		
Ratio of specific heats ($=S_p/S_v$)	γ		This symbol is recommended in preference to κ as being in growing use among physicists.
Specific heat	s		The symbol s is recommended in place of c as being in growing use among physicists, and to avoid confusion with "concentration."
Specific heat at constant pressure	s_p		
Specific heat at constant volume	s_v		
Temperature, Centigrade	t or t°	θ	θ may be used when "temperature" and "time" occur in the same expression.
Temperature, absolute	T		
4. Optics.			
Intensity of illumination	I	I_L	
Refractive index	n	n_r	Recommended as finding most general approval.
Refractive power, specific (Gladstone and Dale)	r_G $[r_G]_D^{t^\circ}$		The second symbol is used when it is desired to indicate the temperature and wave length of light.
Refractive power, specific (Lorentz and Lorenz)	r_L $[r_L]_D^{t^\circ}$		
Refractive power, molecular	R_G R_L $[R_G]_D^{t^\circ}$ $[R_L]_D^{t^\circ}$		

Name of quantity.	Symbols recommended. Usual symbol.	Alternative symbol.	Remarks.
4. Optics—contd.			
Rotation, angle of optical	α		
Rotatory power, specific	$[\alpha]$		
Rotatory power, molecular	$M[\alpha]$		Suggested; not definitely recommended.
Velocity of light	v		Suggested; not definitely recommended.
Wave length of light	λ		
5. Electricity and Magnetism.			
Capacity (electric)	C		
Charge, unitary (charge on an electron)	e		
Conductivity (specific conductance)	κ		
Conductivity equivalent	Λ		$\Lambda = 1000\kappa$/concentration in gram-equivalents per liter.
Conductivity equivalent (at different dilutions—volumes in liters containing 1 gram equivalent)	$\Lambda_{10}\ \Lambda_v$ Λ_∞		
Conductivity, equivalent, of cation and anion	$\Lambda_c\ \Lambda_A$		
Conductivity, equivalent, of specified ions	$\Lambda_{K^{\cdot}}\ \Lambda_{Cl'}$		
Current	I		
Dielectric constant	K		As an *abbreviation*, the symbol *D.C.* is recommended.
Dissociation, electrolytic, degree of (degree of ionization)	α		This is recommended in preference to γ on account of the adoption of the latter symbol for surface tension and ratio of specific heats.
Electromotive force	E		
Faraday's constant	F		
Permeability, magnetic	μ	μ_p	
Potential, single electrode, or decompositon potential of anion	$\epsilon_{K^{\cdot}},\ Cl'$		The symbol ϵ is recommended in place of E as the latter is adopted as the symbol for electromotive force.
Potential measured against the hydrogen or calomel electrode, respectively, which is taken as unity	$\epsilon_h,\ \epsilon_c$		
Quantity of electricity	Q		
Resistance	R	R_w	The symbol R has been adopted by the International Electrotechnical Commission.
Susceptibility, magnetic	κ		
Transport number of cation and of anion	$n_C,\ n_A$		

Name of quantity.	Symbols recommended. Usual symbol.	Alternative symbol.	Remarks.
5. Electricity and Magnetism—contd.			
Velocity of cation and of anion in cm./sec. when the potential gradient is 1 volt/cm.	U_C U_A		
Velocity of specified ions under unit potential gradient	$U_{K^\cdot}$ $U_{Cl'}$		

The Commission reserved consideration of symbols for the following quantities: Coefficient of self-induction; Concentration, expressed in various units; Current density; Diffusion coefficients; Free energy; Mobility of ions; Solubility; Critical solution temperature.

ALEX. FINDLAY, *Secretary.*

The Committee on Inorganic Nomenclature made the following report, which was adopted:

This Committee is unanimously in favor of adopting the symbols:

I for Iodine; Xe for Xenon; W for Wolfram; Nb for Niobium, but is of the opinion that the question of adopting the symbol Be for Beryllium, in place of Gl, should be referred to the prospective International Commission on Inorganic Nomenclature, with a strong recommendation in favor of the symbol Be.

The Committee recommends that in indexing inorganic compounds the constituent atoms, including carbon, should be arranged in alphabetical order.

It is not desirable to place carbon at the commencement of the formula as is usual in indexing organic compounds. It is, however, desirable to make an exception to the alphabetical order in the cases of hydrogen and oxygen, which should always be placed at the end of the formula.

In order to facilitate reference to compounds containing water of crystallization, it is suggested that it would be desirable to insert, after the formula of the anhydrous compound, the formulae of the hydrated varieties, both in the form $F + xH_2O$, and in the empirical form with the hydrogen and oxygen embodied therein.

Binary compounds are to be regarded as additive and not as substitution compounds, the negative component forming the termination, and indicating the class of compound, and the positive component providing the name of the individual.

The recommendations of the Austrian and Russian National Committees for indicating the relative numbers of atoms of each element in the molecule are approved; *e. g.*, N_2O_5 becomes dinitrogen pentoxide and not nitrogen pentoxide.

In order to obtain shorter names for substances, it is considered desirable to indicate the valency of the positive component by means of a suffix, the valencies one to eight being represented by the suffixes o, a, i, e, -on, -an, -in, -en, in the order given, *e. g.*, the two chlorides of mercury would be respectively named mercuro and mercura chloride.

It is recommended that an International Commission composed of one member from each country represented in the Association, be appointed, with Professor Werner as chairman, by November 1, 1913, at latest.

This International Commission should appoint a small working Committee of seven members, whose expenses should be defrayed out of the funds of the International Association of Chemical Societies.

The Committee on Organic Nomenclature recommended the appointment of a small working committee of five members, not necessarily members of the Council, to receive and consider the reports of the National Committees and further to suggest methods for the organization and carrying out of future work, the expenses of the committee to be defrayed from the funds of the Association. This recommendation was adopted and similar action was taken with regard to further work on Inorganic Nomenclature and on the Unification of Physico-Chemical Symbols.

SOCIETIES AFFILIATED TO THE INTERNATIONAL ASSOCIATION OF CHEMICAL SOCIETIES with the Date of Entry into the Association.

In accordance with Article V of the Statutes, this list of the Societies is arranged in alphabetical order of the names, in the French language, of the countries they represent.

	Date of entry.	Number of members.
Deutsche Chemische Gesellschaft	April 25, 1911	3356
The Chemical Society (London)	April 25, 1911	3202
Verein Österreichischer Chemiker	October 28, 1911	1050
Société Chimique de Belgique	August 6, 1913	510
Kemisk Forening, Kjöbenhavn	January 23, 1912	155
Sociedad Española di Fisica y Quimica	April 10, 1912	353
American Chemical Society	October 6, 1911	6091
Société Chimique de France	April 25, 1911	1023
Nederlandsche Chemische Vereeniging	July 14, 1911	515
Società Chimica Italiana	January 11, 1912	654
Tokyo Chemical Society	March 18, 1912	567
Polyteknisk Forenings Kemikergruppe, Kristiania	October 27, 1911	125
Russian Chemical Society	October 22, 1911	410
Schweizerische Chemische Gesellschaft	August 3, 1911	367
The following Societies, not represented on the Council, each sent one delegate in an advisory capacity only to the meetings in Brussels, September, 1913.		
Deutsche Bunsen Gesellschaft für Angewandte Physikalische Chemie	June 19, 1911	777
The Faraday Society (London)	April 30, 1912	202
Société de Chimie Physique	June 15, 1911	225
		19,582

Statutes were proposed for the affiliation of the International Committee on Atomic Weights with the International Council.

As the International Council of Chemical Societies now has funds of its own, the expenses of the meeting no longer fall on the individual societies forming the Association.

[CONTRIBUTION FROM THE CHEMICAL LABORATORY OF THE UNIVERSITY OF CALIFORNIA.]

THE INFLUENCE OF HYDROGEN ION AND OF NEUTRAL SALTS UPON COLOR CHANGES AND REACTION VELOCITIES AMONG DYES OF THE TRIPHENYLMETHANE SERIES.

(ON CATALYSES WITH WEAK ACIDS, V.)

BY H. C. BIDDLE.

Received October 7, 1913.

1. Introductory.—As I have shown,[1] the speed of the assumption of color in the well-known magenta test for aldehydes, in the presence of excess of weak acids, closely resembles the conversion of the cinchona alkaloids into their toxins under like conditions. Thus the speed increases with acids of decreasing dissociation constant and decreases with acids of increasing dissociation constant. Furthermore the speed of the conversion increases in the presence of a weak acid, such as acetic, with the molecular concentration of the acid. Here, as in the case of the cinchona alkaloids, at least two factors apparently enter into the reaction—the inhibiting influence of the H^+ ion on the one hand and the accelerating influence of the molecule of the organic acid on the other.

The study of this catalysis was extended from the more complicated magenta reaction to the less involved conversion of a triphenylmethane dye from the colorless to the colored form, attention having been confined to the behavior of methyl violet in the presence of chloroacetic and acetic acids. Here, as in the case of the magenta reaction, the speed of conversion of the benzenoid to the quinoid form, in the approach toward a condition of equilibrium between the two forms, was found to be greater in the presence of the acid of lower dissociation constant. Subsequent study has shown that this law is general in its application to similar dyes of the triphenylmethane series, the reaction rate being a function, as will appear later, of the diminishing concentration of the H^+ ion. Thus, for example, rosaniline, para-rosaniline, malachite green and methyl violet all exhibit the same general phenomenon with normal solutions of such acids as chloroacetic, acetic, propionic etc., the speed of the reaction increasing with acids of decreasing dissociation constant.

In the previous paper on this catalysis[2] the question was raised, as to whether the speed of this reaction is a function *solely* of the diminishing

[1] THIS JOURNAL, 35, 273 (1913).

[2] Biddle, THIS JOURNAL, 35, 281 (1913).