badly ventilated decks than it was among the others. In all other respects the men were exposed to precisely similar conditions; they wore the same clothes, ate the same food, and all of them slept in hammocks slung very close together. Thus the experience has the value of a carefully planned experiment in showing the effect of freely moving air as a preventive of infections of this nature. Another striking instance, recorded by Colonel Adami, F.R.S., in the first volume of his book on the "War Story of the Canadian Army Medical Corps," was noted in the review published in the first number for this year. The winter of 1914–15 was very wet, and the troops under canvas on Salisbury Plain suffered extreme discomfort, but nevertheless continued in excellent health. When, after some six weeks, the discomfort of tent life and the increasing cold of winter induced the authorities to replace the tents by huts, then influenza and throat troubles began to spread at once and rapidly, and, what was worse still, a series of cases of cerebro-spinal fever occurred.—*The British Medical Journal.*

SCIENTIFIC BOOKS

Life Zone Investigations in Wyoming. Merritt Cary. North American Fauna, No. 42. October 3, 1917, pp. 1–95; pls. I.–XV.; text figs. 1–17.

The Biological Survey has for many years been gathering data on the ecological relations of animals and plants in North America with particular reference to the transcontinental life zones. Several generalized maps of the entire continent have been published, and a series of detailed studies by states and provinces is well under way. The results of some of the latter have already been published, and another is now presented in the present report on Wyoming. This is based on a number of years' field work in the state by the author and other members of the Biological Survey.

In a brief introduction attention is called to the life zones as "a fairly accurate index to average climatic conditions, and, therefore, . . . useful as marking the limits of agricultural possibilities, so far as these are dependent upon climate." They are thus valuable as an index to the possibilities of agriculture in undeveloped regions.

With the caption "Physiography and Climate," there is also a description of the varied physiography of Wyoming, which is characterized particularly by mountains, plains and valley basins. This variety of surface produces likewise a varied climate, though mostly cool by reason of the high base level, and arid excepting on the higher mountains.

Under the heading "Life Zones of Wyoming," the transcontinental ecologic belts occurring in the state are treated at length, and a careful account is given of their divisions, if any, their area, altitudes, the most important localities covered by each, their physical and faunal characteristics, and their agricultural possibilities. For each zone there are added long lists of trees, shrubs, herbaceous plants, of mammals, and of breeding birds; mention is made also of reptiles, but of no other vertebrates and of no invertebrates. Doubtless, however, the mollusks and insects would, at least in the main, substantiate the results obtained from the plants and the higher vertebrates. The characteristics of these five zones are so carefully worked out that a summary of the author's conclusions may be worth presenting in this connection.

The Upper Sonoran Zone, which occupies most of the valleys and lower plains, from altitudes of 3,100 to 6,500 feet, is the home of the broad-leaved cottonwood, juniper, salt bush and yucca; of such mammals as *Eutamias minimus pictus, Citellus tridecemlineatus parvus, Lepus californicus melanotis;* and of such breeding birds as *Zenaidura macroura marginella, Tyrannus vociferans, Passerina amœna,* and *Icteria virens longicauda.*

The Transition Zone, which embraces the high plains, the basal slopes of the mountains, and all the foothills except the highest, and ranges from altitudes of 4,000 to 8,500 feet, is characterized by yellow pine, narrow-leaved cottonwood, and sage brush; mammals like *Odocoileus virginianus macrourus, Sciurus hudsonicus dakotensis, Neotoma cinerea cinerea,* and *Lepus townsendi campanius;* and such breeding birds as *Centrocercus urophasianus, Cryptoglaux acadica acadica, Empidonax*

ORGANIC TYPE FORMULAE

ALIPHATIC SERIES

COLUMN I.

HYDROCARBONS

SATURATED		UNSATURATED	
PARAFFINS C_nH_{2n+2} ALKANES	OLEFINES= C_nH_{2n} ALKENES	ACETYLENES= C_nH_{2n-2} ALKINES	
$H-C(H)(H)-H$ METHANE			
$H-C(H)(H)-C(H)(H)-H$ ETHANE	C_2H_4 ETHYLENE OR ETHENE	C_2H_2 ACETYLENE OR ETHINE	

ALKYL HALIDES

$H-C(H)(H)-Cl$ METHYL CHLORIDE OR MONOCHLORMETHANE

$R-X$ X=HALOGEN R=ALKYL

ALKYL GROUP=R: CH_3, C_2H_5, C_nH_{2n+1}

ALCOHOLS

$H-C(H)(H)-OH$ METHANOL OR METHYL ALCOHOL

$-OH$ ALCOHOL GROUP

$H-C(H)(H)-ONa$ SODIUM METHOXIDE OR SODIUM METHYLATE

$R-C(H)(H)-OH$	$R-C(H)-OH$	$R-C(R)-OH$
PRIMARY ALCOHOL	SECONDARY	TERTIARY

ETHERS

$H-C(H)(H)-O-C(H)(H)-H$ METHYL ETHER

$-O-$ ETHER GROUP

$R-O-R$ ETHERS

ALDEHYDES

$H-C(H)-C=O$ ETHANAL OR ACETALDEHYDE

$-C(=O)-H$ ALDEHYDE GROUP

$R-C(=O)-H$ ALDEHYDES

KETONES

$H-C(H)(H)-C(=O)-C(H)(H)-H$ PROPANONE OR ACETONE

$-C(=O)-$ KETONE GROUP

$R-C(=O)-R$ KETONES

ACIDS

$H-C(H)-C(=O)-O-H$ ETHANOIC OR ACETIC ACID

$-C(=O)-OH$ CARBOXYL GROUP

$R-C(=O)-OH$ ACIDS

ACID DERIVATIVES

$H_3C-C(=O)-ONa$ SODIUM ACETATE

$-C(=O)-OM$ M=METAL SALT GROUP

$R-C(=O)-OM$ SALTS

$H_3C-C(=O)-OCH_3$ METHYL ACETATE

$-C(=O)-OR$ ESTER GROUP

$R-C(=O)-OR$ ESTERS

DERIVATIVES CONTINUED ABOVE

$C=O$ = CARBONYL GROUP

COLUMN II.

$H_3C-C(=O)-O-C(=O)-H$ ACETIC ANHYDRIDE

$-C(=O)-O-C(=O)-$ ANHYDRIDE GROUP

$R-C(=O)-O-C(=O)-R$ ANHYDRIDES

$H_3C-C(=O)-NH_2$ ACETAMIDE

$-C(=O)-NH_2$ AMIDE GROUP

$R-C(=O)-NH_2$ AMIDES

$H_3C-C(=O)-Cl$ ACETYL CHLORIDE

$R-C(=O)$ ACYL GROUP

$R-C(=O)-X$ ACYL HALIDES

SUBSTITUTED ACIDS

$H_3C-COOH$

$H_2C(Cl)-COOH$	$H_2C(OH)-COOH$	$H_2C(NH_2)-COOH$
CHLORACETIC ACID	HYDROXYACETIC ACID	AMINOACETIC ACID

$H_2C(CN)-COOH$	$H_2C(COOH)_2$
CYANACETIC ACID	MALONIC ACID

AMINES

$N(H)(H)(CH_3)$ METHYL AMINE; $N(H)(CH_3)(CH_3)$ DIMETHYL AMINE; $N(CH_3)(CH_3)(CH_3)$ TRIMETHYL AMINE

$N(H)(H)(H)$ AMMONIA

$N(H)(H)(R)$ PRIMARY AMINE; $N(H)(R)(R)$ SECONDARY; $N(R)(R)(R)$ TERTIARY

$R-O-N=O$	$R-N(=O)=O$	$R-O-N(=O)=O$
NITRITES	NITRO COMPOUNDS	NITRATES

NITRILES OR ALKYL CYANIDES

$H_3C-C\equiv N$ ACETONITRILE OR METHYL CYANIDE

$-C\equiv N$ NITRILE GROUP

$R-C\equiv N$ NITRILES

ISONITRILES OR CARBYLAMINES

$H_3C-N=C$ METHYL ISOCYANIDE OR METHYL CARBYLAMINE

$-N=C$ CARBYLAMINE GROUP

$R-N=C$ CARBYLAMINES

SULPHUR COMPOUNDS

H_3C-SH	$-SH$	$R-SH$
METHYL MERCAPTAN	MERCAPTAN GROUP	MERCAPTANS
$H_3C-S-CH_3$	$-S-$	$R-S-R$
METHYL SULPHIDE	THIO-ETHER GROUP	THIO-ETHERS
$R-S-S-R$	$R-S-M$	$R-COSH$
DISULPHIDES	MERCAPTIDES	THIO-ACIDS

$R_2S=O$	$R-S(=O)=O$	$R-S(=O)=O-H$
SULPHOXIDES	SULPHONES	SULPHONIC ACIDS

METALLIC ALKYL COMPOUNDS

$Mg(Br)(C_2H_5)$ MAGNESIUM ETHYL BROMIDE

$Zn(C_2H_5)(C_2H_5)$ ZINC ETHYL

$M(X)(R)$ M=Mg, Zn, etc.

$M(R)(R)$ =METALLIC ALKIDES

COMPILED BY ALEXANDER LOWY.

wrightii, Cyanocephalus cyanocephalus, and *Hylocichla fuscescens salicicola.*

The Canadian Zone, which covers the middle mountain slopes and the highest foothill ranges, occurring at altitudes of from 7,500 to 10,500 feet, is the boreal forest belt of spruce, fir, lodgepole pine, and aspen; and is furthermore delimited by such mammals as *Alces americanus shirasi, Glaucomys sabrinus bangsi, Phenacomys orophilus, Evotomys gapperi galei,* and *Lepus americanus americanus;* with such birds as *Charitonetta albeola, Nuttallornis borealis, Melospiza lincolnii lincolnii, and Sitta canadensis.*

The Hudsonian Zone, which is a narrow belt covering the timberline region, and ranging from altitudes of 9,000 to 11,200 feet, is marked chiefly by the white-barked pine, dwarfed spruce and fir; together with such mammals as *Ovis canadensis canadensis, Eutamias oreocetes,* and *Ochotona uinta;* and such birds as *Nucifraga columbiana* and *Pinicola enucleator montana.*

The Arctic-Alpine Zone, which occupies the mountain crests and the portion of the peaks above timberline, in places from 9,500 to 13,785 feet altitude (the summit of the highest mountain in the State), is a treeless area, the vegetation of which is limited to low bushes like *Salix nivalis,* and other humble plants like *Dryas octopetala* and *Poa arctica,* and is the home of such breeding birds as *Lagopus leucurus altipetens, Leucosticte australis, Leucosticte atrata* and *Anthus spinoletta rubescens.*

The term "Upper Sonoran" as used here is really not a zone in the strict sense, and would be better called "Upper Austral," of which zone it is the western arid division. Although no mention is made of the fact, the so-called "Arctic-Alpine Zone" is really a part of the Arctic Region, which, in North America, covers the tundra area of the northern part of the continent and the mountain tops above timberline in the more southern parts of Canada and in the United States; and the four other zones of Wyoming belong to the Nearctic Region.

Following the main part of this bulletin is a well-annotated list of the conspicuous trees and shrubs of Wyoming that are of importance in the delimitation of life zones. The numerous half-tones illustrate the different types of physiography and the ecological relations of the vegetation. Of particular interest are the pictures of *Picea engelmanni* and *Pipus albicaulis* at timberline, which show the dwarfing and distorting effects of the severe climatic conditions under which they here live.

The author's careful and detailed treatment of this extremely interesting and intricate subject leaves little to be desired; and it is a matter of great regret that he could not have lived to carry his investigations into other parts of the United States.

Harry C. Oberholser

SPECIAL ARTICLES

A CHART OF ORGANIC CHEMISTRY, ALIPHATIC SERIES

In connection with the elementary organic chemistry course given at the university I deemed it advisable to have charts made to be placed in the lecture and laboratory rooms, where students may consult them at all times. In order to emphasize certain endings, type groups, etc., red lettering was used.

The chart, which is 92″ x 55″, is reproduced on the preceding page.

An analogous chart of the aromatic series is in course of preparation.

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