show conclusively that no concentration of radiation on the retina from any artificial illuminant is sufficient to produce injury thereto under any practical conditions.

Eclipse blindness, the only thermic effect on the retina of common occurrence clinically, is due to the action of the concentrated heat on the pigment epithelium and chorioid, this heat being almost wholly due to radiations of the visible spectrum, within which the maximum solar energy lies.

The abiotic energy in the solar spectrum is a meager remnant between wave-lengths 295 $\mu\mu$ and 305 $\mu\mu$, aggregating hardly a quarter of one per cent. of the total. At high altitudes and in clear air it is sufficient to produce slight abiotic effects such as are noted in snow blindness and solar erythema, the former only occurring with long exposures under very favorable circumstances and the latter being in ordinary cases complicated by an erythema due to heat alone. The amount of abiotic energy required to produce a specific effect in solar erythema is substantially the same as that required for mild photophthalmia.

Erythropsia is not in any way connected with the exposure of the eye to ultra-violet radiations, but is merely a special case of color fatigue temporary and without pathological significance.

Vernal catarrh and senile cataract we can find no evidence for considering as due to radiations of any kind.

Glass blowers' cataract, often charged to specific radiation, ultra-violet or other, we regard as probably due to the overheating of the eye as a whole with consequent disturbed nutrition of the lens.

Commercial illuminants we find to be entirely free of danger under the ordinary conditions of their use. The abiotic radiations, furnished by even the most powerful of them, are too small in amount to produce danger of photophthalmia under ordinary working conditions even when accidentally used without their globes. The glass enclosing globes used with all practical commercial illuminants are amply sufficient to reduce any abiotic radiations very far below the danger point.

Under ordinary conditions no glasses of any kind are required as protection against abiotic radiations. The chief usefulness of protective glasses lies not so much in their absorption of any specific radiations, as in their reducing the total amount of light to a point where it ceases to be psychologically disagreeable or to be inconveniently dazzling. Glasses which cut off both ends of the spectrum and transmit chiefly only rays of relatively high luminosity, give the maximum visibility with the minimum reception of energy. For protection against abiotic action in experimentation, or in the snow fields, ordinary colored glasses are quite sufficient.

So far as direct destruction of bacteria within the cornea or any other tissues of the body is concerned, abiotic radiations possess no therapeutic value. This is due to the fact that abiotic radiations that are able to penetrate the tissues are more destructive to the latter than to bacteria.

F. H. VERHOEFF,
LOUIS BELL

SOCIETIES AND ACADEMIES

THE AMERICAN MATHEMATICAL SOCIETY

BY invitation of Brown University, the twenty-first summer meeting of the society was held at that institution on Tuesday and Wednesday, September 8–9, in connection with the celebration of the one hundred and fiftieth anniversary of the founding of the university. Two sessions were held on Tuesday and a morning session on Wednesday, the attendance including fifty-two members. President Van Vleck occupied the chair at the morning sessions, being relieved by Vice-president L. P. Eisenhart at the Tuesday afternoon session. New members were elected as follows: Mr. L. K. Adkins, University of Minnesota; Dr. Lennie P. Copeland, Wellesley College; Mr. J. W. Cromwell, Jr., Washington, D. C., High Schools; Professor Tsuruichi Hayashi, Tôhoku Imperial University, Sendai, Japan; Professor C. I. Palmer, Armour Institute of Technology; Mr. G. A. Pfeiffer, Columbia University; Mr. P. R. Rider, Yale University; Dr. Alfred Rosenblatt, University of Cracow; Miss Caroline E. Seely, Columbia University. Eleven applications for membership were received. It was decided to hold the annual meeting about January 1, the exact date to be so fixed that those who wish

may attend the winter meeting of the Chicago Section and the meeting of Section A of the American Association, as well as the annual meeting. At the latter meeting, which will be held in New York, President Van Vleck will deliver his presidential address.

A committee was appointed to arrange for holding the summer meeting of 1915 at San Francisco. It was decided to issue only the List of Officers and Members next year, in place of the usual Annual Register.

The authorities of Brown University extended a lavish hospitality to the society. The morning session on Tuesday opened with an address of welcome by Chancellor A. B. Chace. Professor N. F. Davis entertained the members and ladies at tea in the John Carter Brown Library on Tuesday afternoon, and at luncheon in Rockefeller Hall on Wednesday. The university gave a dinner in honor of the society at the University Club on Tuesday evening, the occasion concluding with a cordial address by President Faunce and an interesting account by Professor Carl Barus of the "Historical development of the modern theory of physics." A vote of thanks was tendered to the university and its officers for their generous hospitality. Wednesday afternoon was devoted to an excursion to Newport.

The following papers were read at this meeting:

F. M. Morgan: "A plane cubic Cremona transformation and its inverse."

L. P. Eisenhart: "Conjugate systems with equal tangential invariants and the transformation of Moutard."

C. E. Love: "Singular integral equations of the Volterra type."

O. E. Glenn: "Modular invariant processes."

L. E. Dickson: "Invariants, seminvariants and covariants of the ternary and quaternary quadratic form modulo 2."

L. E. Dickson: "The points of inflection of a plane cubic curve."

L. E. Dickson: "A fundamental set of modular invariants of the system of the binary cubic, quadratic and linear form."

L. E. Dickson: "Invariants in the theory of numbers."

F. B. Wiley: "Proof of the finiteness of the modular covariants of a system of binary forms and cogredient points."

E. V. Huntington: "The theorem of rotation in elementary dynamics."

R. D. Beetle: "Congruences associated with a one-parameter family of curves."

G. C. Evans: "The non-homogeneous parabolic differential equation."

R. A. Johnson: "The conic as a space element."

W. A. Hurwitz and L. L. Silverman: "On the consistency and equivalence of certain definitions of summability."

Maxime Bôcher: "The method of successive approximations for linear differential systems."

Maxime Bôcher: "The smallest characteristic numbers in a certain exceptional case."

B. H. Camp: "On the series obtained by termwise integration."

G. A. Miller: "On the ϕ-subgroup of a group."

T. E. Mason: "On functions transcendentally transcendental with respect to a given realm of rationality."

T. E. Mason: "Mechanical device for testing Mersenne numbers for primes."

H. S. Vandiver: "On Bernoulli's numbers, Fermat's quotient and last theorem."

L. C. Karpinski: "An early algorism."

H. S. White: "Triple systems on 31 letters; a reconnois-sance."

L. D. Cummings: "The trains for 42 non-congruent triple-systems on 15 elements."

J. H. M. Wedderburn: "On matrices whose coefficients are entire functions."

E. R. Smith: "A problem in the fitting of polynomial curves to certain kinds of data."

H. R. Kingston: "Metric properties of nets of plane curves"

G. D. Birkhoff: "The iterated transformation of a plane into itself."

W. B. Fite: "Prime power groups in which every commutator of prime order is invariant."

Edward Kasner: "Transversality for double integrals in the calculus of variations and for contact transformations."

Edward Kasner: "The decomposition of conformal transformations into factors of period two."

R. G. D. Richardson: "A new boundary value problem for linear hyperbolic differential equations of the second order."

Joseph Rosenbaum: "Mixed linear integral equations over a two-dimensional region."

D. C. Gillespie: "Cauchy's definition of a definite integral."

The next regular meeting of the society will be held at Columbia University on October 31. The San Francisco Section will meet at the University on October 24.

F. N. COLE,
Secretary