through the epidermis. In *Rhipsalis glaucosa* a number of accessory abortive flowers were found. *Cuscuta glomerata* was mentioned as the only other plant in which, so far as the speaker knew, subepidermal flowers occur.

One person was elected to active membership.

WILLIAM TRELEASE,
Recording Secretary.

DISCUSSION AND CORRESPONDENCE.

ZOOLOGICAL NOMENCLATURE.

EDITOR OF SCIENCE: I fear that the subject may verge on becoming tedious to your readers, but will ask the privilege of concluding my part in the discussion by a few comments on two points raised in Mr. Bather's communication of January 10th (p. 154).

It will hardly be denied that the date of printing will always be useful to the systematist in noting a period earlier than which publication of a paper *cannot* be claimed, even if we ignore the obvious fact that in nearly every case it will now-a-days closely approach the date of distribution or actual publication. Hence, the committee should consider well before minimizing its value.

Secondly, it has been held, with some plausibility, that the distribution by favor alone should not constitute publication, but that the ability of any one interested to procure a paper by purchase is essential to an effective publication. If now, by a doctrine of ethics which is certainly novel to me, the committee decides that no paper can be regarded as published until the society which prints it is ready to sell the complete volume of which it may form a part, it is obvious that the committee has it in contemplation to put a quietus on the prompt publication of separate papers, unless this is done commercially by the society in question, in the first place. To this proposition I believe it will be impossible to obtain the assent of workers in systematic natural history, and justly so.

The reasons are obvious and need not be enlarged upon. I think it is not unfair to add that most libraries in this country would rather pride themselves on procuring, even at the cost of seven shillings, at the earliest practicable moment, a paper demanded by their readers; and would consider its belated acquisition in the miscellaneous volume of a scientific society, subsequently, as no reflection upon their performance of their duties to the public.

WM. H. DALL.

THE RED-BEDS OF KANSAS.

THE correlation of the Red-Beds of Kansas has hitherto been impossible to satisfactorily settle, as has been stated by Professor Prosser in his admirable report upon them in the second volume of the University Geological Survey of Kansas. Many persons have diligently sought for fossils in them, but entirely without success until recently. About two years ago Mr. C. N. Gould discovered a horizon just south of the Kansas line and at the base of the Kansas series, containing large numbers of a small phyllopod crustacean, examples of which, when referred to Professor T. Rupert Jones, through Professor Prosser, were determined as *Estheria minuta* with some doubt, as stated in his paper in the *Geological Magazine* (1898, p. 291).

Associated with these crustacean remains, the blocks sent with the skeleton showing numerous specimens, was a large part of the skeleton of an amphibian. This specimen is now in the University of Kansas collection, but so far has been only partly freed from its matrix, a work of much tediousness. The parts already brought to light, however, enable me to determine it as *Eryops megacephalus* Cope, a form described from the 'Permian' of Texas.

This identification settles once for all the horizon whence it came as Permian, if the Texas beds be really of that age. There are several hundred feet of deposits in Kansas above this horizon that still possibly may be considered as Triassic, but there is no reason for so doing. *Estheria minuta* is a Triassic species, but, even if correctly determined, its value is slight in comparison with that of the vertebrate in the correlation of the beds. It must be remembered, however, that *Eryops* is by no means necessarily characteristic of the Permian.

S. W. WILLISTON.

MEN OF SCIENCE AND ANTI-VIVISECTION.

IF, according to my critic (SCIENCE, Dec. 16, 1898, p. 873), the efforts of the anti-vivisection-

ists are to be regarded as antics, or as the idiotic spot upon the brain of many people, the writer lacked wisdom in urging that men of science, thus far only cognizant at second hand of the points at issue, should divest themselves of the bias of *esprit-de-corps*, and, emerging from the influences exerted upon them by a sub-division of their colleagues, decide, through their own investigation, for or against experiments on living animals.

In the writer's opinion, however, not fully expressed in the number of SCIENCE referred to, the adequate hearing, which has not been, should be given to the allegations of the anti-vivisectionists, namely: (1) That the experiments have not helped medical or scientific knowledge. (2) That the experiments are not properly restrained, and can be pursued in the United States not only by scientific men, but by tyros, or by others in an undue, excessive and superficial manner. (3) That whether to the advantage of scientific knowledge or not, the practice of painful experiment on unwilling living creatures, by a human mind aware of the significance of pain upon the higher animals, is an act founded on no right and degrading to that human mind.

In the latter allegation, passing by here the two preceding it, the writer sees the real issue. Denying such tendency of the experiment on the experimenter, seeming willing to leave to the latter his present unrestricted latitude, the advocate of vivisection, apparently under sanction of the National Academy of Sciences, asserts not only an excuse, but a right for the experiments in their alleged advantage to science and the human race.

This is to fortify the practice in one of the strongest ways possible, since the thought trend of the human majority makes naturally toward a magnification of its own successes, and a justification of the latter even when demonstrably achieved at the expense of insignificant and unvoiced suffering. The right of communities to advantage (amuse) themselves by human pain still exists among certain savage and barbarous peoples. The right of nations, proceeding, for their own alleged advantage, to practice felony and murder (according to their rule laid down for individuals), to act frequently upon the abused precepts of Machiavelli, while proclaiming Christianity, is not potently questioned throughout Christendom, while the notion of restraining the alleged rights of civilized communities and individuals to advantage (amuse) themselves by the infliction of great pain on lower forms of life has entered the heads of but few of those thus advantaged. Nevertheless, some ameliorations have been made in certain cases towards the alleviation of the pain, which has been supposed to confer the benefit upon its inflictor, and the attempt of the human friend of animals, in this instance, to set limits to the gains of humanity is not more unreasonable than the existence of certain limits already set by humanity itself to its own gains.

When human public opinion forbids by law the practice of forcible vivisection upon a felon condemned to death, it limits the advance of scientific knowledge by ruling off the dissecting table a class of fiber and tissue more valuable for medical study, while not demonstrably more significant to the community, than the fiber and tissue of a dog. If we forbid the hypnotist to learn by experiment upon the human subject, whether the latter can be mesmerically influenced to steal, commit adultery, lie, or otherwise yield to inborn passions, we again obstruct science. When society denies the right of doctors to test theories and modes of treatment, or to advance scientific knowledge, by occasionally killing or paining moribund human patients in hospitals, it retards scientific knowledge by limiting a class of experiment more valuable to the experimenter than similar inflictions by analogy upon animals. At the same time the restraint acts upon a principle no more logical, no less so, than that which moves the anti-vivisectionist.

But in its deeper sense the late movement in defense of animals justifies itself not in logic, which has not yet solved the mystery of pain, torture and death, but rather in the expansion of the very potent principle of love or sympathy.

Raising clearly and fully a momentous question which, it is to be regretted, Science did not honor herself by raising for them, the defenders of animals proclaim that the whole question of the ravages of *Homo sapiens* (who seems to have

lost touch with fellow animals somewhere in the stone or bonze age, *since which time he has ceased to domesticate them*) upon the lower forms of life needs revision; that many of the ravages are unjust, nay cruel and degrading; that in many cases they should be ameliorated through human education, while in other indefensible instances they should be abolished by human law.

In this agitation the observer of humanity, from the widening point of view of anthropological science, sees not a fanatical outbust, but an extension of one of the potent familiar factors of human development, an evolution of the ancient and ever-growing protest against the alleged right of extreme might, constituting itself the judge, whether as populace or despot, priest or tyrant, egotist or felon, science or creed, to forcibly inflict pain upon insignificant or helpless victims.

Science, since Darwin at least, admits no such chasm as theology formally alleged, between animals and man, while, with the wider study of nature, the attitude of mind which has previously circumscribed the activity of human redress to human ills fades away.

It is the effort which affected the abolition of gladitorial combats, burnings at the stake, torture chambers, the Inquisition, serfdom, the abatement of slavery and the persecution of Jews, which is now seen to expand. Long limited in sympathy to the groans of man, it is now led, by the power of expanding knowledge, to listen to the cry of man's speechless victim, the tortured brute.

Suddenly and strangely, at the close of the nineteenth century, we mark, throughout civilized peoples, the uprising of societies and individuals who, again rejuvenating the thought of Buddha, appear unselfishly to strive to extend human sympathy beyond the human barrier. But the outgrowths are not spontaneous. It is because of one of the most potent of the forces which has led man from darkness toward civilization that they exist. It is because of a principle that should be dear to the heart of a man of science, and for which Science herself has suffered, that the idea of the human being advancing his own knowledge by acts so selfish as vivisection meets with self-condemnation.

Flint (Text-book of Physiology) frequently exposing the nerve roots of dogs in public demonstrations; Castex (*Archives Gen. de Medicine*, Jan. and Feb., 1892) clubbing out of joint the shoulders of unnarcotized dogs to show how to massage them; B. A. Watson (Experimental Study of lesions arising from severe concussion, 1890) dropping living dogs from heights so as to produce and then study on them concussion of the spine; cutting the intestines of living dogs and then sewing the ends together with dull needles in certain ways, to study circular sutures; Phelps' fixing the joints of living dogs in cramped positions for six weeks and five months, to see if anchylosis would ensue; Porter (*Journal of Physiologists*, April 6, 1895) exposing for its entire length the cervical cord of a narcotized dog and severing it at the sixth cervical vertebra; seizing the phrenic nerve of thirteen lightly narcotized dogs and rabbits and tearing it out of the chest; studying respiration (Report Royal Humane Society, 1865, pp. 31–66) by plunging the heads of seventy-six living animals in liquid plaster-of-paris until suffocation ensued by the hardening of the plaster in the bronchial tubes in four minutes; Chauveau (Wilberforce to the *Zoologist*, London, July, 1892) studying excitement of spinal marrow upon eighty living horses and asses by chiseling open the vertebræ and exposing the marrow; washing out parts of the brains of living dogs and studying their future action in subsequent days or weeks (Pfluger' Archives, 1888, p. 303). These are acts which, when known in the light of widening sympathy, gradually become intolerable to the human mind.

HENRY C. MERCER.

SECTION OF AMERICAN AND PREHISTORIC ARCHÆOLOGY AT THE UNIVERSITY OF PENNSYLVANIA, January 9, 1899.

[It is desirable for this JOURNAL to admit discussion of scientific questions, however little the point of view may commend itself to most men of science. Mr. Mercer states that the anti-vivisection movement does not justify itself in logic, and hence argument seems somewhat futile. If any of our readers are influenced by Mr. Mercer's remarks we recommend them

first to try to verify the references given at the end, in which they will fail, and second to read 'Vivisection: a statement in behalf of Science,' published in the issue of this JOURNAL for March 20, 1896, and endorsed by President Eliot, of Harvard University, and the late Francis A. Walker, President of the Massachusetts Institute of Technology.—ED. SCIENCE.]

ASTRONOMICAL NOTES.

REPORTS OF OBSERVATORIES.

THE annual reports of three of the most active observatories of the world are at hand.

1. *Report of Her Majesty's Astronomer at the Cape of Good Hope for the year 1897.*—The astrophotographic telescope was used for chart plates, catalogue plates, variables, and with a 20-degree prism for a spectroscopic survey of stars to 3½ magnitude. The transit circle was used for stars needed for the measurement of plates to complete the Cape zones, —40° to —52°. 9,000 standard stars will be included in this area. The 7-inch equatorial has been chiefly used to look up discrepancies in the photographic plates and in checking missing stars. Among the results obtained was the confirmation of the large proper motion of 9″ in the star which Kapteyn had detected on the plates. The heliometer was used chiefly in triangulation of comparison stars for observations of planets at opposition. Preparations were making for the mounting of the new McLean telescope, constructed by Grubb, and the new transit circle by Troughton and Simms. The computations were chiefly upon the meridian observations of former years, and upon heliometer observations for parallax. Dr. Gill has eleven regular assistants and computers, with other computers occasionally employed. The observatory carries on an extensive system of time signals, and the geodetic survey of South Africa will be under the direction of the government astronomer.

2. *Report of the Superintendent of the U. S. Naval Observatory for the year ending June 30, 1898.*—The 26-inch equatorial has been used for micrometric observations of the faint comets, satellites, close doubles and the diameters of Venus and Mercury. The 12-inch telescope has been similarly used for astercids and comets. The 9-inch transit has been used for sun, moon, planets and certain stars. The new 6-inch steel transit is in process of erection. The 5-inch altazimuth has been used as a zenith telescope and as a vertical circle. The opinion is expressed that declinations can be obtained with greater accuracy by this instrument than by a meridian circle. The astronomical work has been materially lessened by the detachment of line officers for active service in the recent war, necessitating the care of nautical instruments, chronometers and time service by the astronomical staff. This report goes into minute detail regarding the work of the Observatory, even mentioning such minor matters as the mounting of a new thermometer, and the repairing of the wooden cases of clocks, the glue in which had deteriorated. The Nautical Almanac has been under the care of the Astro nomical Director, Professor Harkness. The chief publication has been the Catalogue of Stars from observations made from 1866–1891, prepared by Professor Eastman.

3. *Fifty-third annual report of the Director of the Astronomical Observatory of Harvard College, for year ending September 30, 1898.*—The 15-inch equatorial has been used for photometric observations chiefly of variables. The 6-inch equatorial has been used for observations of variables by the method of eye estimates. The meridian circle has been used to complete the observations for the southern zone—9°50′ to—14°10′. The meridian photometer has been devoted to the reobservation of the stars in the Harvard Photometry and other stars fainter than those in that catalogue. The 8-inch and 11-inch photographic telescope, working under the Henry Draper Memorial, have obtained more than 3,000 plates. Their study has resulted in various discoveries, such as twelve variables, stars of peculiar spectra, one spectroscopic binary, one spectrum of a meteor with five bright lines, one spectrum of the aurora with four bright lines. At Arequipa, Peru, more than 2,400 plates have been made with the 8-inch, 13-inch and 24-inch telescopes. Professor Bailey's study of variables in clusters has revealed 509 variables in 20 clusters; the light