consideration of the masses of the nitrogen and CO molecules one would expect a difference of two per cent. for the vibrational shifts of corresponding systems. It would seem that the differences in the forces in the two molecules is such as to compensate for the differences in masses.

The presence of CO in my apparatus was probably due to its evolution from the nickel cylinder upon which the gauze was mounted. This nickel must have contained nickel carbonyl, which breaks down at high temperatures and yields CO. Facilities for the complete outgassing of this tube were not available.

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ANOTHER LUMINOUS SPIDER

A NOTE on "A Luminous Spider," published by me in SCIENCE, August 21, 1925, it seems has been copied in the London *Sphere,* and another observation has been reported in a letter from Mr. C. H. Bompas, Bishops Stratford, Herts, England, which reads:

I have read your note on a phosphorescent spider from Burma in the *Sphere.*

As you are presumably interested in such things you may like to know that I have seen such a spider at Shillong, in Assam.

The spider is truly phosphorescent and switches on its light when frightened. It is some time since I saw one, but my recollection is that the light came from six or eight spots under the abdomen.

The one I saw was in the middle of a bush and when approached or shaken glowed more brightly, no doubt as a means of defense.

The locality from which this second occurrence is reported is about one hundred miles from the place of my observation in Burma. While the observation differs in many respects, it is, I think, well worth recording.

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THE METHODS OF THE FUNDAMENTALISTS

DR. KEEN'S experience with the "constructive memory" of the Rev. W. B. Riley, D.D. (SCIENCE, December 11, 1925, p. 543) just about matches a more recent one of my own with another important Fundamentalist.

My attention was called to an article, "The Bible and Evolution," in *The Herald of Christ's Kingdom* (September 15, 1925, p. 275) in which there appears a long quotation from Darwin's "Life," which examination proves to be made up by combining portions of two paragraphs that in Darwin's text (Vol. 1, pp. 277 and 282) stand four and one half pages apart. In this "quotation," moreover, Darwin's words (p. 282) "I deserve to be called a Theist" appear as "I deserved to be called an atheist"—and the usual moral is drawn.

I wrote the editors of *The Herald of Christ's Kingdom,* setting forth these facts, with all the proper references. I also wrote that their article contains, along with this, a great many more similar oversights; and I offered, since they proposed to bring out a reprint of their "special evolution number," to send them a list of a dozen or twenty of these errors, which I agreed to check up carefully, provided they would agree not to reprint in their new edition any fact on my list which they themselves could not verify, and would withdraw the spurious quotation.

They rejected my offer. This is the sort of evidence that is now being presented to state legislators to get laws forbidding the teaching of evolution. Moreover, these people are not anywhere in the mountains of Tennessee, but at 177 Prospect Place, Brooklyn, New York.

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SCIENTIFIC BOOKS

Left-handedness. By BEAUFORT SIMS PARSON. New York, Macmillan, 1924. Pp. 185.

THE fundamental differences that determine right- and left-handedness have probably not been discovered by Mr. Parson, and yet his experimental results are very suggestive. He calls attention to the fact, so often observed, that right-handed persons are usually right-eyed. Ordinarily the right eye has better vision. This is usually the eye selected for monocular use with microscope or rifle. But the author points out a more important meaning of the term, right-eyedness, which is this.

If we fixate a distant object with both eyes, a near object gives us a double image. If, maintaining our fixation, we grasp the near object and so move it as to bring its image on the fovea, it is usually upon the fovea of the right eye that the image falls. This means that when we point to an object we place the pointing finger along the line of vision of the right eye. Were we to direct both eyes toward the finger, the right eye would remain stationary and the left would move. In this sense the right eye is dominant. In reaching for an object that casts double images, it is stimulation of the right eye that determines our movement.

As aiming is done along the right eye's line of vision, the right hand is more likely than the left to

be employed, for it has a shorter distance to travel. Thus, the author believes, the right hand receives more education and gradually assumes predominance.

Mr. Parson's apparatus for determining right- and left-eyedness is inadequately described in the book, but consists of a stereoscope face-piece attached to an enclosed box containing shutters by means of which the preferential use of the right or left eye is determined. This is called a "manuscope," a name as unwarranted as the author's statement that "eyedness is cause and handedness effect." There is no measure given of the reliability of the following results, obtained from the examination of school children of Elizabeth, N. J.:

604 subjects were right-handed and right-eyed
225 subjects were right-handed and left-eyed
4 subjects were left-handed and right-eyed
32 subjects were left-handed and left-eyed

The subject's own statement was taken as the criterion of right- and left-handedness. Handedness corresponded to eyedness in 74 per cent. of the cases. But we may analyze the author's results as follows:

If right-handed, the chances that a subject will be right-eyed are 72 in 100.

If left-handed, the chances that a subject will be left-eyed are 89 in 100.

If right-eyed, the chances that a subject will be right-handed are 99.3 in 100.

If left-eyed, the chances that a subject will be left-handed are 12 in 100.

Mr. Parson's hypothesis could be reversed and it would work quite as well. He could have assumed an original right-handedness and have derived his right-eyedness. An originally greater activity of the right arm would introduce the infant's hand more frequently into the right than into the left eye's line of vision. Thus more habits would be built up about foveal stimulation of the right eye, and right-eyedness would result from original right-handedness. All that is needed to disprove the author's thesis that right-handedness is derived from right-eyedness is a left-handed baby congenitally blind in the left eye. It would be well to look for such a case.

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SPECIAL ARTICLES

QUESTIONNAIRE ON CERTAIN FACTS BEARING ON THE THEORY OF SEXUALITY AND CHROMOSOME CONSTITUTION

IN order to obtain a clearer understanding of the phenomena of sexuality the writer has put the following questions to himself while attempting to arrive at a proper theory of sex and sex determination. They may be of use to others who may be wandering about in a slough of despond if not in a fool's paradise, vainly attempting to satisfy their minds that the hypothesis of homozygous and heterozygous sex potentialities or "sex chromosomes," still so naïvely held, is the explanation of the nature and cause of sexuality and sexual states, when at best it could never be more than an explanation of unisexuality and dieciousness as contrasted with hermaphroditism and bisporangiateness. Certainly any one intent on finding a way to the truth must be confused if he still entertains such an hypothesis after he has become aware of the fact that organisms, both plant and animal, with allosomes nevertheless can be reversed, the female to the male and the male to the female condition in spite of the fact that one sex in the given case has a homomorphic set of allosomes and the other a heteromorphic set.

(1) If maleness and femaleness are the result of and conditioned on the presence of specific sex genes or potentialities, how does it happen that a cell lineage (either with haploid or diploid chromosome complements) without a change of chromosome content, without aggregation (fertilization) or segregation (reduction) can nevertheless pass successively from (1) a neutral state, to (2) a female state, to (3) a neutral state, to (4) a male state?

(2) Why are the staminate and carpellate branches of various monecious plants just as fixed in their sex and just as extremely dimorphic as they are in dieicious plants?

(3) If sexuality is a matter of hereditary factors either simple or multiple, why did the higher plants with an alternation of generations evolve a condition in which sex segregation or sex determination never follow reduction, and in which sex determination usually (except in the case of the rather rare diecious plants) does not follow promptly on fertilization, but male and female determinations take place during the vegetative period of the diploid sporophyte?

(4) If in some organisms, with allosomes, in which there is a homozygous condition in one sex and a heterozygous condition in the other, these conditions are regarded as the cause of sex determination, sex production or sex stability, how does it come about that not only the heterozygous sex can be reversed to the opposite condition but the assumed homozygous sex can also be reversed, sometimes as readily as the heterozygous one? How does the homozygousness in relation to sex change to heterozygousness?

(5) If it is assumed that in the heterozygous individual, in respect to allosomes, one allosome was dominant over the other in determining sex and then, in case of sex reversal, necessarily becomes recessive