dissected approximately 21 days after treatment. Floral development was scored (9). We equated flower induction with the formation of floral primordia (stage 2 or above).

Extracts from flowering plants were active in the *Xanthium* assay only when supplied simultaneously with GA (Table 1). Extracts from vegetative plants were not active either with or without GA. The application of GA alone caused slight swelling of the apex (stage 1) but did not induce floral primordia.

In the duckweed (*Lemna*) bioassay, extracts were tested on *Lemna perpusilla* 6746 grown in noninductive conditions (10). The test plants were floated on 20 ml of water (distilled in glass) that contained either 1 to 100 mg of extract or 0.02 to 2 mg of autoclaved GA, or both. After 4 hours, these plants were transferred to 50-ml flasks that contained 25 ml of modified Hoagland's medium (11). Plants were dissected 10 days later, and flowering was evaluated on a percentage basis (10).

The results of the *Lemna* bioassay were consistent with the results of the *Xanthium* bioassay (Table 2). However, *Lemna* did not need the addition of GA for flower formation. Autoclaved GA appeared to inhibit flowering in *Lemna*, which is consistent with the report of Hillman (12).

Our results indicate that flowering *Xanthium* plants contain extractable substances that will induce flowering in two genera. These substances do not appear to be present in the vegetative *Xanthium* plants.

H. KENT HODSON
K. C. HAMNER
Department of Botanical Science,
University of California,
Los Angeles 90024

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Polyploidy in the Common Tree Toad *Hyla versicolor* Le Conte

Abstract. *A karyotype of the first known naturally occurring anuran polyploid in North America is described. Hyla versicolor, the common tree toad, is tetraploid (2n → 4n = 48). Individual chromosomes representing each set of four of the Hyla versicolor karyotype correspond closely with those of the diploid (2n = 24) Hyla andersonii karyotype.*

Naturally occurring polyploid anuran amphibians have been unknown in North America. Beçak *et al.* (1) and Bogart (2) reported polyploidy in two species of South American anurans, *Odontophrynus americanus* and *Ceratophrys ornata.* Bogart noted that these are the only examples of independent, bisexual, naturally occurring polyploid populations known among the vertebrates. Bushnell *et al.* (3) determined a haploid number (n = 12) for "*Hyla versicolor*" collected at Reelfoot Lake, Tennessee. It now appears that their material was not *Hyla versicolor*, but *H. chrysoscelis* (4). I now report a series of tetraploid (2n → 4n = 48) *Hyla versicolor*.

The population I investigated is from Alpine, Bergen County, New Jersey. Chromosome preparations were made by the standard squash technique (2) from corneal cells obtained from two series of adult individuals (nine males and one female) collected during the spring of 1968 and 1969. In addition, in the spring of 1969, a clasping pair found in the breeding pond at Alpine was brought into the laboratory, where it produced a clutch of zygotes. Of the resulting larvae, squashes were made of tail tips of a random sample of 19, all of which were tetraploid; both parents were also tetraploid.

Of the 12 sets of 4 chromosomes from a tetraploid male (Fig. 1), 5 are relatively long and 7 are relatively short. Among the longer chromosomes, 4 of the sets consist of metacentric or submetacentric chromosomes, and 1 set subtelocentric. In the latter set, 1 of

Fig. 1. Karyotype of tetraploid (2n → 4n = 48) *Hyla versicolor.* Scale bar represents 10 μm. The chromosome sets are numbered from 1 to 12 from longest to shortest, respectively.

Fig. 2. Karyotype of diploid (2n = 24) *Hyla andersonii* adult male collected 19 km southwest of South Toms River, Ocean County, New Jersey. Scale bar represents 10 μm. The chromosome sets are numbered from 1 to 12 from longest to shortest, respectively.

the 4 chromosomes shows clear secondary constrictions at the tip of its longer arm. Among the shorter chromosomes, 2 sets are distinctly subtelocentric, and the remaining sets are submetacentric to metacentric. The chromosomes of each set compare closely with corresponding chromosomes of the diploid(2n =24) *Hyla arborea japonica* (5), and *Hyla andersonii* (Fig. 2), a tree toad found in sandy pine barrens from New Jersey to South Carolina.

Although I have not sampled individuals of *H. versicolor* from other populations, individuals examined from a population of this species at Bastrop, Bastrop County, Texas, are also tetraploid (6). It therefore appears likely that there are several tetraploid populations of this species or that the species is entirely tetraploid.

If the sibling species, *H. chrysoscelis*, is indeed diploid, it would account for the high degree of incompatibility demonstrated in hybridization tests between *H. chrysoscelis* and *H. versicolor* (7), as well as the difference in trill rate between the two forms (4).

AARON O. WASSERMAN
Department of Biology, City University of New York, New York 10031

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Neurophysiological Localization of the Vertical and Horizontal Visual Coordinates in Man

Abstract. *The amplitude of the potential evoked by a moving grating, recorded from the occipital scalp, is less when it is oblique compared with vertical and horizontal. This inequality is not found by recording the electroretinogram. Thus, orientational effects must arise between the site of origin of the electroretinogram and the evoked cortical response.*

The resolving power of the human visual system is better in the vertical and horizontal orientation than in the two oblique orientations (1). Many explanations have been advanced to account for this observation, and certain of these have been eliminated. For example, it is now quite certain that the effect is not caused by the optics of the eye (2).

The remaining hypotheses range from pure psychological explanations to detailed neurophysiological mechanisms. For example, our ability to see better in the vertical and horizontal orientations may be because our visual environment is largely composed of verticals and horizontals and that we have "learned" to use these orientations better. On the other hand, the anatomical finding of Colonnier (3), who found in the visual cortex of the cat that the stellate cells have specifically oriented dendritic fields, supports a structural explanation, provided that the human visual cortex is similarly organized. Studies in the cat and monkey of cortical cells selectively sensitive to the orientation of a moving bar or edge show that all orientations are equally well represented and that there is nothing peculiar about the oblique orientations (4). However, studies of the cat show that a higher proportion of cells selectively sensitive to orientation are present in the vertical and horizontal orientations (5). This new finding may be due to these authors' having investigated the properties of simple cells with receptive fields lying very close to the visual axis.

We attempt to establish in man where this orientational effect arises. The technique used is to view a grating pattern generated on the face of an oscilloscope. This pattern is then shifted in phase through 180° at a
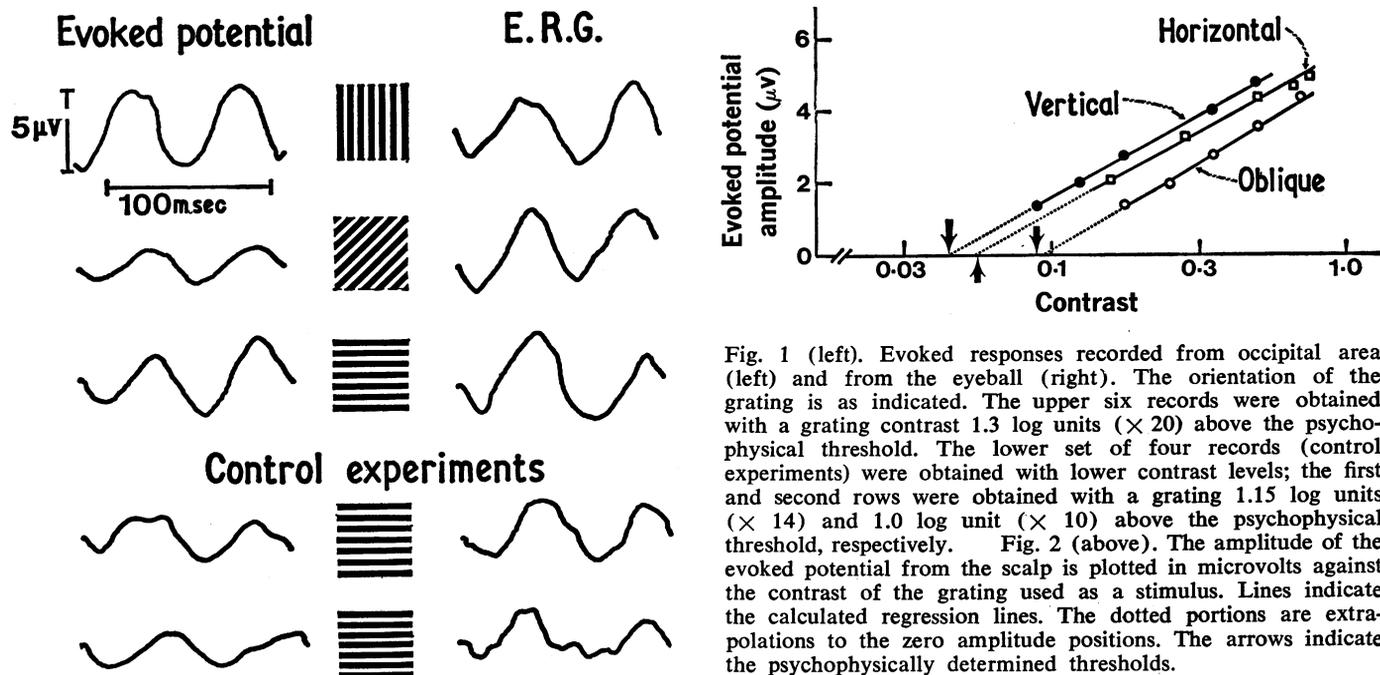

Fig. 1 (left). Evoked responses recorded from occipital area (left) and from the eyeball (right). The orientation of the grating is as indicated. The upper six records were obtained with a grating contrast 1.3 log units (× 20) above the psychophysical threshold. The lower set of four records (control experiments) were obtained with lower contrast levels; the first and second rows were obtained with a grating 1.15 log units (× 14) and 1.0 log unit (× 10) above the psychophysical threshold, respectively. Fig. 2 (above). The amplitude of the evoked potential from the scalp is plotted in microvolts against the contrast of the grating used as a stimulus. Lines indicate the calculated regression lines. The dotted portions are extrapolations to the zero amplitude positions. The arrows indicate the psychophysically determined thresholds.