ers in mind, this expectation would not arise if the title were a less comprehensive one, such as "Chemical Analysis and Specifications of Military Explosives."

The text will be a handy reference for persons engaged in control analysis since the directions are clear and concise. It is, perhaps, a small point, but the reviewer hopes that the phrase "explosive chemistry" occurring in the title of the text does not find common usage. Many students and chemists have had experiences in "explosive chemistry" without having been interested at such times in the "Chemistry of Explosives."

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SPECIAL ARTICLES

GUAYULE PLANTS WITH LOW CHROMOSOME NUMBERS

SUCH Russian workers as Dianova *et al.*[1] and Botschanszeva[2] reported that *Parthenium argentatum* (guayule) usually has 72 chromosomes (diploid number). Recently we learned from G. Ledyard Stebbins, Jr. (personal communication), that he has found among plants from commercial strains from Salinas the following chromosome numbers: $2n = 54$, 58 (± 2), 72, 74 and 108–112.

In the fall of 1942, Dr. LeRoy Powers collected seeds of guayule in Mexico and Powers and Walter T. Federer in the Trans-Pecos region of Texas. Many of the plants grown from seeds collected in Durango, Mexico, have thinner leaves than those of the 72-chromosome types. In general they may be characterized as vigorous growers, early and prolific seed producers. Many are light green in color, probably due to a chlorophyll deficiency. On both light and dark green plants the trichomes are shorter than on plants of higher chromosome number. Eleven of these plants were examined cytologically and were found to have from 36 to 39 chromosomes. They are from four different locations within the mountainous area on the border of which are the towns of Santa Librada, Patinta, Maravillas, Capilla and S. Francisco, southwest of the city of Mapimí.

Chromosome counts were made mostly at the diakinesis and prophase II stages in pollen-mother-cells because chromosomes are better separated then than at metaphase II, although the latter was used whenever possible. Flower heads were prefixed in a mixture of seven parts absolute alcohol and one part glacial acetic acid. Dissected disc florets were stained with synthetic orcein in 45 per cent. acetic acid. Mature pollen grains were stained with aniline blue-lactophenol. Five hundred from each plant were counted to determine the amount of aborted grains. The diameter inside the exine of 100 grains from each plant was measured with an ocular micrometer.

These plants are considered to be diploids because at diakinesis all eleven plants have 18 pairs of chromosomes. A few pollen-mother-cells in one plant seemed to show an association of four chromosomes and in another plant possibly as many as three such associations. Whether these are due to reciprocal translocations or are an indication of polyploidy is not known at present. In addition, most of these plants showed one, two or three very small chromosomes. These very small chromosomes are to be seen also in plants from Texas and in commercial strains. A study of somatic chromosomes seen occasionally in dividing tapetal cell nuclei has led to the supposition that these small chromosomes are the equivalent of the short arm of one of the types of medium-sized chromosomes. Lagging chromosomes were seen in one plant. Chromatid bridges were observed in three other plants.

In addition to these eleven plants, the pollen of another from the same area was studied carefully. Although the amount of aborted pollen varied considerably among the different plants (from 3 per cent. to 60 per cent.) the diameter inside the exine of filled grains was quite uniform. An average of these twelve plants showed that 5 per cent. measured 12.4 μ, 33 per cent. 14 μ, 58 per cent. 15.5 μ and 3 per cent. 17.1 μ. The grains are not absolutely spherical. For comparison, an average of five plants which belong to the 72-chromosome class showed that one per cent. measured 15.5 μ, 9 per cent. 17.1 μ, 57 per cent. 18.6 μ, 27 per cent. 20.2 μ, 5 per cent. 21.7 μ, and one per cent. consisted of giant grains. In addition, a limited examination was made of the pollen of 28 more plants from the same area. Since all showed the same-sized pollen grains as the 12 mentioned above, they also are considered to be diploids having 36 or about 36 chromosomes.

A cytological study also has been made of two dwarf plants from seeds collected in Texas. Both were found recently by Dr. Powers among plants grown from seed collected on the O2 Ranch. They are dwarfed, with thin, crinkled leaves that have a tendency to cup. One had a height of 5 cm and spread of 6 cm compared with nine normal plants in the same collection and culture which averaged 14 cm and 14 cm respectively. The second had a height of 7 cm and spread of 7 cm, while eight normals in the same collection and culture averaged 13 cm and 15 cm, respectively. How-

[1] V. I. Dianova, A. A. Sosnovetz and N. A. Steschina, *Beih. Bot. Centralb.*, 53: 294, 1935.

[2] S. Botschanszeva, *Acta Univ. Asiae Mediae, Tashkent, Ser. VIII b, Botanica:* fasc. 15, 1933.

ever, they have the same coloring as the rest of the plants in the culture which have 72 (±1 or 2) chromosomes. The anthers were shrunken, transparent and practically empty. Among immature anthers a few gigantic, misshapen pollen grains were found, these apparently consisting of the entire pollen-mother-cells which had developed an exine, and a few compound small grains, the results of only partial cytokinesis. A dividing tapetal cell nucleus of one of these plants showed 38 chromosomes, including one very small one. The other plant had 36 to 38 chromosomes, as indicated by an examination of the diakinesis and metaphase I stages in pollen-mother-cells. In both plants only a few bivalents were found at metaphase I. The univalents, of greater length than when associated as bivalents, were scattered somewhat along the axis of the spindle. The walls of the pollen-mother-cells were extremely thin. It was concluded that although these two dwarf plants also belong to the 36-chromosome class, they are to be considered as haploids of the 72-chromosome population in which they occurred.

The contrast in morphological appearance and in chromosome behavior between the 36-chromosome plants from Durango and those from Texas emphasizes the fact that more than mere chromosome number is needed for an understanding of the appearance and breeding behavior of guayule plants. Judging by the plants obtained from seed collected in Mexico and in Texas, the 36-chromosome Durango plants seem to be the only type in certain locations and to comprise an appreciable part of the population in other locations where 54-chromosome plants also occur; whereas the 36-chromosome plants from the O2 Ranch in Texas are among the off-types found in a population that seems to consist almost entirely of 72 (±1 or 2) chromosome plants.

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FATAL ENCEPHALITIS IN MAN DUE TO THE VENEZUELAN VIRUS OF EQUINE ENCEPHALOMYELITIS IN TRINIDAD

BY the early part of October, 1943, approximately seventy cases of fatal encephalitis had occurred among the horses and mules in Trinidad, British West Indies. The epizootic was tentatively diagnosed as equine encephalomyelitis by the local authorities from the clinical symptoms presented. Accordingly, the sector veterinarian of Trinidad, Major R. T. Gilyard, Army of the United States, sent representative portions of brain tissue from two donkeys, two horses and a mule that had died of the disease to the laboratories of the Army Veterinary School, Medical Department Professional Service Schools, Army Medical Center, Washington, D. C., for diagnosis. The first material, that from a donkey, was received on October 11, 1943. Later he submitted brain tissue from a human case of encephalitis that had died on August 22, 1943. Brain tissue was shipped in buffered glycerine by airmail express and arrived within two days after shipment.

A ten per cent. suspension of brain tissue was prepared from each of the six cases and injected intracerebrally in 0.1 cc amounts into two guinea pigs, and in 0.03 cc amounts into three Swiss mice. The inoculated animals presented typical symptoms of equine encephalomyelitis in periods varying from three to eight days. They were sacrificed while in a moribund condition and their brains removed for further study.

The laboratory animals inoculated with brain suspensions from the donkeys, horses and mule became prostrate within 96 hours. Those inoculated with the human brain tissue became prostrate by the eighth day. This may be explained by the fact that brain tissue from the animals was received within two to three days after autopsy, whereas the human brain tissue had been held in Trinidad for six weeks in buffered glycerine solution under refrigeration before it was shipped to this laboratory.

Laboratory animals infected with virus from each of the six cases were sacrificed when prostrate, their brains removed, and when found to be bacteriologically sterile were prepared for typing of the viruses.

These six strains of virus when isolated were injected intracerebrally into each of three groups of guinea pigs; one group immunized against Western type virus, the second group against the Eastern type and a third group of normal animals. The groups of Western immune and normal guinea pigs died within 96 hours and in the Eastern immune group the death period extended to the fifth or sixth day, a condition that has previously been noted in Eastern type immune animals injected with the Venezuelan equine encephalomyelitis virus.[1] The results on the animal brains were reported to Major Gilyard on October 21, 1943.

By this time we had obtained Venezuelan equine encephalomyelitis vaccine and immunized a group of guinea pigs. Two weeks after completion of vaccination this group exhibited no illness following intracerebral injections of the six isolated viruses, indicating that the virus was the Venezuelan type in all six instances. Guinea pigs immunized against the Eastern and Western viruses and normal animals served as controls.

[1] C. E. Beck and R. W. G. Wyckoff, SCIENCE, 88, 530, 1938.