for these points, so that the results are to be regarded as qualitative rather than quantitative. It should be noted that Rod No. 31 exhibits a greater change than Rod No. 32. This is in agreement with previous observations[4] on the permeability and magnetostriction of these rods which showed that Rod No. 31 is more ferromagnetic than Rod No. 32.

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STROPHANTHIN. XIX. THE DEHYDROGENATION OF STROPHANTHIDIN AND GITOXIGENIN

IN the course of our investigation of the structure of the cardiac aglucones a number of these substances have been submitted to the action of dehydrogenating agents with the hope of obtaining reaction products which would point to the structure of the fundamental hydrocarbon skeletons upon which these aglucones are built. Following preliminary inconclusive experiments with platinum black and sulfur, the use of the selenium method of Diels, Gädke and Körding[1] has been employed and has given results of a more promising character. The preliminary observations with strophanthidin and gitoxigenin are as follows.

STROPHANTHIDIN

A mixture of 45 gm of strophanthidin and 65 gm of selenium was heated in an atmosphere of nitrogen for 45 hours at 330–340°. The chloroform extract of the reaction mass yielded a thick oil. A preliminary distillation of this material at 2 mm gave 12.3 gm of semi-crystalline substance which when refractionated at 2 mm gave the following hydrocarbon fractions.

Fraction I. −190°. 1.9 gm of a thick yellow oil which crystallized only partially on standing.

Fraction II. 190–210°. 3.9 gm of partly crystalline material.

Fraction III. 210–230°. 1.9 gm mostly crystalline.

Fraction IV. 230–250°. 1.6 gm mostly crystalline.

Fraction I gave a picrate in alcoholic solution which after recrystallization from an alcoholic picric acid solution was reconverted into the hydrocarbon. This separated at first from alcohol as shining plates which melted at 112–115°. After four recrystallizations from alcohol the melting point was raised to 130–134°. Analysis gave C 92.99, 93.26; H 6.55, 6.88. Calculated for $C_{18}H_{16}$: C 93.05, H 6.95.

The molecular weight determined in camphor gave 228, 212. Calculated for $C_{18}H_{16}$: 232.

Fraction II, after pressing off the oil, gave plates from alcohol which at first melted at 180–195°. After successive recrystallizations from alcohol, acetic anhydride and benzene it melted at 230–237°.

Analysis gave C 93.29, 93.34; H 6.09, 5.92.

Fraction III, after pressing off adhering oil and recrystallizing from alcohol, first melted at 195–210°. After repeated recrystallizations from acetic anhydride, benzene and finally thiophene it melted at 240–245°.

Analysis gave C 93.64, 93.41; H 6.29, 6.25.

Fraction IV was obtained as plates from alcohol. After repeated recrystallization from acetic anhydride, alcohol and thiophene a faintly yellow substance was obtained, which melted at 285–292°. This hydrocarbon was practically insoluble in alcohol, ether, petroleum ether and acetone.

Analysis gave C 93.66, 94.00; H 5.71, 6.04. Calculated for $C_{23}H_{18}$: C 93.83, H 6.17.

The molecular weight determination gave 310, 315. Calculated for $C_{23}H_{18}$, 294.

GITOXIGENIN

When gitoxigenin was dehydrogenated with selenium about 20 per cent. of its weight of hydrocarbon was recovered. This was separated roughly into two fractions. The lower fraction was an oil which slowly and incompletely crystallized. This was converted first into a picrate which after recrystallization was reconverted into the hydrocarbon. After two recrystallizations from alcohol, platelets were obtained which melted at 135–150°.

Analysis gave C 92.80, H 6.45.

Fraction II was partly crystalline. The oil was pressed off. Recrystallization from alcohol gave platelets which melted at 195–210°. After several recrystallizations from acetic anhydride it melted at 223–230° and resembled closely in solubility and crystalline form the so-called $C_{23}H_{18}$ hydrocarbon obtained from strophanthidin.

Analysis gave C 93.70, 93.86; H 6.25, 6.06.

Owing to the great difficulties attending the isolation of homogeneous individuals from mixtures of hydrocarbons, especially where the amounts available are so limited, the observations here given may be

[4] S. R. Williams, *Phys. Rev.* 29, 370, 1927, and D. R. Inglis, *loc. cit.*

[1] O. Diels, W. Gädke and P. Körding, *Ann. d. Chem.*, 1927, *459*, 1.

regarded only as preliminary and can only suggest the general nature and probable molecular size of these substances. Further work is in progress, the results of which will be described in detail elsewhere.

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THE FAUNA OF THE MIDDLE DEVONIAN BEAUVAIS SANDSTONE OF MISSOURI

THE complexly faulted Little Saline Creek area of Ste. Genevieve County, Missouri, has been the site of one of the University of Chicago's geological field camps for nearly twenty summers. During the course of detailed field mapping students and instructors alike have, from year to year, continued to find new structural and paleontological features, many of which have proved to be of more than local interest. One of the early discoveries was the fact that a brown, sugary sandstone, which had been called the St. Peter by some geologists, was in reality very much younger than that formation. This sandstone, which proved to be only one of a complete sequence of lower and middle Devonian formations preserved in a down-faulted block, was early designated by Weller as the Beauvais formation. His detailed description of the sandstone, however, did not appear until posthumously in 1928.[1]

The stratigraphic position of this sandstone between the Onondagan Grand Tower limestone and the Hamilton St. Laurent formation having been determined, its mid-Devonian age was established. Its exact correlation with other deposits of somewhat similar age, however, has been difficult because of its essential lack of well-preserved organic remains. According to Weller, fossils are rare in the formation and have been observed only at an outcrop on the Little Saline Creek near the Boarman School road. At this locality a number of species of invertebrates are represented by poorly preserved internal casts. The only species which is at all common is one identified as *Newberrya claypolei;* the condition of the others does not permit their identification. Branson and Williams,[2] however, five years earlier listed the following species from the Beauvais sandstone:

Atrypa reticularis (Linnaeus)
Chonetes vicinus (Castelnau)
Schizophoria striatula (Schlotheim)
Spirifer granulosus (Conrad)
Stropheodonta demissa (Conrad)
Tentaculites sp.

No locality is given for these species, but as Branson and Williams say that the specimens studied "were collected" and "most of the species were identified by Professor Weller's students before they were sent to the writers . . ." we may assume that they came from the locality mentioned above, and that Professor Weller felt that the identifications were none too certain.

One of the interesting discoveries of the field season of 1930 was the fact that the Beauvais sandstone is fossiliferous at other localities than that previously mentioned. One of these borders the old road on the south side of Peach Tree Ridge almost directly north of the Boarman School; a second is situated along the southern side of the triangular fault block of Beauvais near the top of the above-mentioned ridge, and the third occurs near the northern apex of the easternmost Beauvais fault block on Troublesome Hill, not far west of the Ozora-St. Mary's road. All three of these localities are at or near fault lines where the sandstone, as a consequence, is somewhat better cemented than usual. As a further result the fossils are more readily identifiable than is the case of those taken from Weller's locality, though it must be admitted that the preservation is not very good. A study of the material from these localities makes it possible to list the following assemblage as the known Beauvais fauna:

Favosites (several species)
Crinoid stems
Bryozoan (dichotomous branching)
Orbiculoides lodiensis var. *media?* (Hall)
Crania crenistriata Hall
Stropheodonta demissa Conrad
Leptaena rhomboidalis (Wilckens)
Chonetes vicinus (Castelnau)
Camarotoechia sp.
Cyrtina sp.
Schizophoria striatula (Schlotheim)
Atrypa reticularis (Linnaeus)
Athyris fultonensis Swallow
Spirifer granulosus (Conrad)
" *pennatus* (Atwater)
" *varicosus* Hall
" sp.
" n. sp.
Nucula sp. 1
" sp. 2
Nuculites oblongatus Conrad
Palaeoneilo maxima (Conrad)
Pterinea flabellum (Conrad)
Actinopteria boydi Hall
Leiopteria cf. *gabbi* Hall
Modiomorpha sp. 1
" sp. 2

[1] Missouri Bureau of Mines and Geology, 22 (1928): 148–50.

[2] E. B. Branson and J. S. Williams, Missouri Bureau of Mines and Geology, 17 (1923): 131.