MALES

Rats number	Weight Initial	Weight Final	Per cent. incr.	Food int.	Per gm body wt.	Gonads in mg.	Per gm body wt.	Sem. ves. in mg.	Per gm. body wt.	
406, 407	49.5	153.5	210	584	2.8	*4622.3*	*15.0*	*534.9*	*1.7*	Controls
410, 411	53.5	172.5	222	626	2.6	*4789.1*	*13.8*	*822.9*	*2.4*	Aq. extr.
414, 415	49.5	109.5	121	467	3.9	*976.5*	*4.4*	*44.3*	*0.2*	Oil-sol. extr.

FEMALES

Rats number	Weight Initial	Weight Final	Per cent. incr.	Food int.	Per gm body wt.	Ovaries in mg.	Per gm. body wt.	Uteri in mg.	Per gm body wt.	
408, 409	50.0	125	150	575	3.8	*184.7*	*0.73*	*635.3*	*2.5*	Controls
412, 413	48.5	119	145	531	3.8	*232.3*	*0.97*	*623.0*	*2.6*	Aq. extr.
416, 417	47.0	115.5	145	484	3.5	*125.1*	*0.54*	*307.9*	*1.3*	Oil-sol. extr.

satory effect of theelin-like substances present in relatively large amounts in the oil-soluble extracts.

The sex-inhibiting substance was found roughly in the same fraction which contains the male hormone and is present in normal urine. Control experiments of long duration injecting male and female hormones to their respective sexes, as well as treating male animals with female hormone and *vice versa* did not show any appreciable inhibitive effect on sex organs. Some of the inhibitive action of sex hormones, described in the literature, might be due to the presence in them of the substance described in this paper.

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BERRIES RICH IN CALCIUM

HACKBERRIES[1] (*Celtis occidentalis* L.—Urticaceae) have long been used as food by various tribes of North American Indians. The Dakotas[2] pounded the fruit (including pits) and used them as a flavor for meat. The Pawnees pounded the fruit and mixed them with fat and parched corn. The Meskwaki Indians[3] ground the fruit and made them into mush. Hackberries have a sweet pleasant taste with a flavor somewhat resembling that of figs.

The ripe fruit which was used in our investigation was collected during 1930 and 1931 in Nebraska and Kansas. Analysis of the fruit (pulp and pits were ground together) gave the following results (all figures refer to moisture-free fruit); reducing sugar (invert sugar) ranged from 32 to 36 per cent.; non-reducing sugars were absent; pentosans and hemicelluloses, 2–4 per cent.; crude fat (ether extract), 2.8 per cent.; crude protein, (N x 6.25), 11.6 per cent. While it is the usual practice to report separately the analyses of the edible portion of the fruit and the pit, in this article the analysis of the entire fruit is reported, first, because the Indians used the entire fruit, and secondly, because on account of the large pits and small pulpy part this is the only way to use the fruit economically.

The most interesting feature of this fruit is its mineral content. Analysis of several samples gave an average value of 29 per cent. ash, almost half of which (48 per cent.) was CaO, or 13.9 per cent. CaO in the moisture-free fruit. Evidence adduced below indicates strongly that the calcium is present in the fruit as calcium carbonate. In that case, 13.9 per cent. of CaO would correspond to 24.9 per cent.

[1] Although popularly known as berries, hackberries are botanically drupes.

[2] Gilmore, *33rd Ann. Rep.* Bureau Amer. Ethnol., p. 76, 1919.

[3] Smith, *Bull. Publ. Museum,* Milwaukee, p. 265, 1928.

$CaCO_3$, *i.e.*, calcium carbonate constitutes about one-quarter of the weight of the dry fruit. There were also present 1.2 per cent. of oxides of iron and aluminum, and 2.4 per cent. silica. The moisture content of the fruit as received ranged from 15 to 19 per cent.

Payen,[4] in 1854, analyzed the pits of the hackberry and proved that the calcium is present as carbonate by placing the ground, dried pits in dilute hydrochloric acid and weighing the carbon dioxide given off. The results of his analysis are as follows:

Organic matter	28.7 per cent.
Calcium carbonate	64.2 per cent.
Calcium phosphate	trace
Silica	7.0 per cent.

While it is apparent that most of the calcium in the fruit is present in the pit as carbonate, the possibility of the presence of other calcium salts must not be overlooked. In order to investigate this possibility 4.1 kilos of ground hackberries were extracted twice with boiling water. The dried presscake (1.7 kilos) contained 28.7 per cent. CaO and 54.7 per cent. ash. Direct determination showed that 23.6 per cent. of CO_2 was given off on addition of mineral acid to the ground fruit, thus confirming Payen's results and showing that the ash of the extracted material is mostly calcium carbonate. There were also 3.9 per cent silica, and 0.3 per cent MgO in the ash.

The water solution was extracted with ether and on evaporating the ether 16.5 gms of a yellow fatty oil, probably kernel oil, remained. The solution was then precipitated with alcohol. The resulting gummy precipitate weighed 45 gms and contained 10.1 per cent CaO (total ash 23.2 per cent.).

The aqueous-alcoholic solution was precipitated with lead subacetate, and the recovered acids were converted into ethyl esters (62.8 gms) and fractionated. The different fractions were identified by means of the hydrazides. Fraction 1 (0.7 gm) yielded oxalic hydrazide (m.p. 235°). The hydrazide of fraction 2 (1.6 gm) was identified as that of malic acid (m.p. 179°). Fractions 4–8 (23 gms) yielded citric trihydrazide (m.p. 106°). Fraction 9 produced an oily hydrazide. The acid of this fraction is an unsaturated acid which, on oxidation with cold 5 per cent. $KMnO_4$, yields succinic acid and an oily acid.

The conclusion therefore must be drawn that, although most of the calcium in hackberries is in the form of carbonate, there are also calcium salts of malic, citric and oxalic acids, and of some gummy acids, and an unsaturated acid of unknown constitution.

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A recessive zygotic lethal resulting in 2:1 ratios for normal vs. male-sterile and colored vs. colorless pericarp in F_2 of certain maize hybrids: R. A. EMERSON. Maize hybrids between types with red and others with colorless ears normally have colored ears in the first generation, F_1, and exhibit in the second generation, F_2, the typical mendelian ratio of three colored to one colorless, with one third of the colored individuals breeding true in the next generation, F_3. A Peruvian maize with red mosaic ears, when crossed with local inbred strains having colorless ears, gave a 2:1 ratio in F_2 and later generations involving over 1,100 plants. Moreover, the ratio of true breeding to segregating individuals among the colored ears was 1:87, instead of 1:2 as expected. Evidently the 2:1 relation in F_2 is due to the almost complete elimination of the true breeding colored individuals. One of the inbred colorless strains used in crossing with the Peruvian maize was male-sterile, *i.e.*, it produced no good pollen. F_1 was normal, but in F_2 and later generations the normals were to the male-steriles as 2:1, just as with ear color. Of the normals, only one in 37 was colorless and of the male-steriles, only one in 46 was colored. Obviously, this male-sterility is closely linked with ear color, so that whatever distorts the normal ratio of colored to colorless affects similarly the ratio of normal to male-sterile. If there be assumed a genetic factor, closely linked with the factor for colored ears, which prevents the development of the kernels which receive it from both the egg and pollen, the results obtained are readily accounted for. This hypothesis is rendered the more plausible by the fact that self-pollinated colored ears are not well filled with kernels.

The chromosomes of haploid maize, with special reference to the double nature of the univalent chromosomes in the early meiotic prophase: L. F. RANDOLPH (introduced by R. A. Emerson). Certain characteristics of the chromosomes in the root-tip cells and in the microsporocytes of haploid individuals are described and illustrated. The presence of 10 chromosomes in each cell instead of the 20 present in normal diploids facilitated the study of individual differences between the members of the group in the somatic cells, and their existence as univalents rather than as bivalents in the meiotic prophase simplified the interpretation of the double condition of the chromosomes in this stage. At the time of the differentiation of the leptotene threads in the very early

[4] *Compt. Rend.*, 38, 241, 1854. Payen's *Celtis cordata* is synonymous with *C. occidentalis*.