No.	Name of Anaesthetic	Quantity added	Quantity estimated	Variation per cent.
1	Trichlorethylene	1·4 mg./200 c.c.	1·25 mg./200 c.c.	−0·075 mg./100 c.c.
2	Chloroform	1·125 mg./100 c.c.	1·325 mg./100 c.c.	+0·20 mg./100 c.c.

were determined and it was found that in all these cases the results obtained which will be published later are in close agreement with the recent findings of other workers.

My thanks are due to Dr. B. B. Dikshit for his keen interest in the work. My thanks are also due to Lt.-Col. Sokhey, I.M.S., Director, Haffkine Institute, for the facilities given for carrying out the work.

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PANICUM MILIACEUM (GUJARATI-CHENA), A NEW RAW MATERIAL FOR STARCH INDUSTRY

THE fall in the imports of starch into India, and the increased demand for sizing agents for the textile industry, have rendered the search for a suitable indigenous source of starch both urgent and necessary. In view of the prevailing food scarcity, cereals like wheat, maize and jawar are no longer available for industrial purposes. Attempts to utilise, for the first time, the corn *Panicum miliaceum*, which is grown in Gujarat as a side crop during both the rainy and hot seasons, have proved eminently successful. The normal yield of this crop is 20 maunds per acre. The stems and roots of this corn are used as manure. The straw provides excellent fodder in considerable quantity when there is scarcity of fodder. The following is the chemical composition of the grain:—

Moisture 7·8 per cent., Ash 4·95 per cent., Fibre 9·75 per cent., Fat 4·0 per cent., Protein 9·06 per cent., Carbohydrates 64·44 per cent.

The usual treatment of corn, i.e., steeping, milling, caustic treatment and tabling, yields 52 per cent. of pure starch. The starch in microscopic appearance resembles maize starch and possesses the following properties, to recommend its use as a sizing agent in the textile industry:—

The gelatinisation temperature is 76° C.

The following table gives a comparative idea of the viscosity in relation to maize and wheat.

Effect of continued heating at 90° C. on change in viscosity.

(In 1/8 seconds) (By Stormer Viscometer)

3% Starch paste	10 Mts.	15 Mts.	20 Mts.	25 Mts.	30 Mts.	60 Mts.	120 Mts.	180 Mts.	240 Mts.	360 Mts.
Maize ..	57	52	51	51	51	49	45	41	39	37
Wheat .	45	46	46	43	43	39	37	36	35	34
Panicum miliaceum (Chena) ..	37	40	—	41	44	49	54	50	48	40

On large-scale sizing test carried out in textile mill, the results of this starch have been found to be identical to that of the maize starch.

Further, the waste bran obtained after separation of starch from the corn contains 11·4 per cent. protein matter which compares favourably good with other cattle-feeds.

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N¹-SULPHANILYL-ISOTHIOUREAS

ALTHOUGH the preparation of many N¹-sulphanilyl-derivatives of urea, thiourea, guanidine, etc., has been described, there appears to be no systematic study of N¹-sulphanilyl-isothiourea derivatives reported in literature. As these bear structural resemblance to sulphathiazole the following derivatives

(I) acetylaminobenzenesulphonylethylisothiourea, m.p. 180·1°;
(II) acetylaminobenzenesulphonylpropylisothiourea, m.p. 174°;
(III) acetylaminobenzenesulphonylbutylisothiourea, m.p. 157°;
(IV) acetylaminobenzenesulphonylallylisothiourea, m.p. 173–74°; and
(V) acetylaminobenzenesulphonylbenzylisothiourea, m.p. 171–73°;

have now been prepared from the corresponding alkyl isothiourea hydrochlorides and hydrobromides using standard methods.

The free bases corresponding to compounds (I) to (IV) are obtained by digestion with 8-10 per cent. aqueous hydrochloric acid for 15-20 minutes, and they melt respectively at 155-56°, 133-34°, 116° and 170°. Roblin *et al.*[1] prepared the free base of the compound (I) by hydrolysing it with alcoholic hydrochloric acid for two minutes. It has now been found that the hydrolysis of the compounds (I) to (IV) is not carried to completion by this method. Hydrolysis of the compound (V) by the above methods is attended with disruption of the molecule, yielding only sulphanilic acid and benzylmercaptan. Further work on the condensation of other isothiourea hydrobromides

with p-acetylaminobenzenesulphochloride is in progress.

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THE ROLE OF TRYPTOPHANE IN BLOOD FORMATION

ON purely chemical grounds the essential function of tryptophane in the animal organism has been considered to be that of providing the pyrrole ring for the synthesis of hematin. But the experiments designed to throw light on the relation of this amino-acid to blood formation have yielded contradictory results. The beneficial effect of tryptophane injections in experimental anæmia in animals has been reported by Hirasawa (1921),[1] Okagawa and Tatsui (1931)[2] and by Iwakura, Otani and Taniguchi (1933).[3] Fontés and Thivolle (1930)[4] claim to have produced anæmia in rats by feeding them on tryptophane-deficient diets and to have rendered normal animals hyperemic by injection of tryptophane or a tryptophane histidine mixture. Alcock (1933)[5] was, however, unable to confirm either of these observations of the French authors. Hæmoglobin regeneration in animals suffering from milk anæmia was found by Alcock to be unaffected by administration of tryptophane, nor could he render animals anæmic by depriving them of the amino-acid. From determinations of the tryptophane and histidine content of the blood of patients suffering from pernicious and hæmorrhagic anæmia Tochowicz (1936)[6] similarly concluded that these amino-acids play no important part in blood formation.

In the experiments now reported the effect of tryptophane deficiency in the diet was studied in the first place on normal rats and secondly on rats made anæmic by means of phenylhydrazine injections.

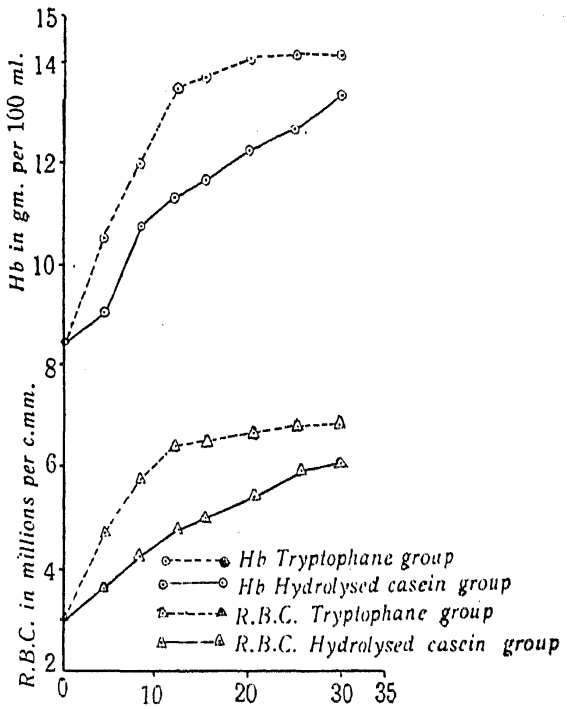
The experimental diet consisted of the following:—Casein (whole or hydrolysed), starch, sugar, butter fat and Steenbock's salt mixture. The vitamins were supplied in the form of yeast and cod-liver oil. Hydrolysed casein provided the tryptophane-deficient diet.

In experiments on normal rats three groups were used, group I receiving whole casein, group II hydrolysed casein plus 20 mg. of tryptophane per rat per day, and group III hydrolysed casein.

R.B.C. determinations were made at the beginning and at the end of the experiment which lasted one month. The average values for R.B.C. in each group are given in Table I, from which it will be seen that the values are slightly lower for animals receiving no tryptophane in the diet than those on the whole casein or hydrolysed casein plus tryptophane. This slight difference was repeatedly found in different series of experiments, but the results are not statistically significant.

However, striking differences due to the absence of tryptophane in the diet were found when animals were first made anæmic by phenylhydrazine as described previously (Yeshoda, 1942).[7]

The results of one experiment on two groups of eight such animals, one receiving hydrolysed casein, the other hydrolysed casein plus tryptophane are summarized in Table II which gives the average increases for R.B.C. and hæmoglobin in each group in twelve days after the stage of acute anæmia. Statistical examination of the values for individual animals in the two groups show the results to be highly significant. Curve I shows clearly the differences in the rates of recovery of the animals in the two groups. While the animals receiving tryptophane had regained their normal R.B.C. values in twelve days and their normal hæmoglobin values in fifteen days, the corresponding periods for the rats in the tryptophane deficient group were about thirty days, and even then the values for both R.B.C. and hæmoglobin were slightly below normal.



There can be no doubt from these experiments that tryptophane plays an important

TABLE I

	Casein			Hydrolysed casein + tryptophane			Hydrolysed casein		
	Days		Increase	Days		Increase	Days		Increase
	0	30		0	30		0	30	
R.B.C. in millions per c.mm.	7·06	8·03	··97	7·12	8·03	·91	6·97	7·49	·52