(1) Agouti,	GG, BlBl, RR, producing gametes		G Bl R
(2) Black,	AA, BlBl, RR,	" "	A Bl R
(3) Red,	AA, BB, RR,	" "	A B R
(4) Red,	GG, BB, RR,	" "	G B R

The cross between (2) and (3) gives AA, BlB, RR, which is black. The gametes produced by this hybrid are ABlR and ABR. The fortuitous union of these gives, in generation F_2:

1 AA, BlBl, RR; 2 AA, BlB, RR; 1 AABBRR,
or 3 black and 1 red.

The cross between (2) and (4) gives AG, BlB, RR (agouti), producing gametes ABlR, ABR, GBlR, GBR. The fortuitous union of these gives:

(a) 1 AA, BlBl, RR; (d) 2 AG, BlBl, RR; (g) 1 GG, BlBl, RR;
(b) 2 AA, BlB, RR; (e) 4 AG, BlB, RR; (h) 2 GG, BlB, RR;
(c) 1 AA, BB, RR; (f) 2 AG, BB, RR; (i) 1 GG, BB, RR
or

1 Black	2 Agouti	1 Agouti
2 "	4 "	2 "
1 Red	2 Red	1 Red.

This gives 9 agouti, 4 red, and 3 black.

If the cross (2) $\times$ (4) (= AG, BlB, RR), is crossed with (3) (AA, BB, RR) we get:

Gametes of (2) x (4)		Gametes of (3)
ABlR	x	ABR = AA, BlB, RR (black)
ABR	x	ABR = AA, BB, RR (red)
GBlR	x	ABR = GA, BlB, RR (agouti)
GBR	x	ABR = GA, BB, RR (red),

or 2 reds, 1 black, and 1 agouti. Professor Castle states that 4 types of reversionary agoutis probably occur in the cross (2) $\times$ (4), 3 of which have been obtained in his experiments. Table I. above, giving generation F_2 of this cross, shows that the type (e) (AG, BlB, RR) occurs in four sixteenths of this generation, type (h) (GG, BlB, RR) in two sixteenths, and type (d) (AG, BlBl, RR) in two sixteenths. These are the three types he found in his experiments. The fourth type, (g) (GG, BlBl, RR) occurs in only one sixteenth of this generation. The small number of individuals in which this type occurs doubtless accounts for the fact that it has not yet been found in the experiments.

From the formulæ of these four types we readily see why they behave as stated by Professor Castle. Type (e) is the same as the cross (2) $\times$ (4), and therefore gives, in generation F_2, 9 agoutis, 4 reds, and 3 blacks; (h) produces gametes GBlB and GBR. These uniting with ABR (red) give half AG, BlB, RR (agouti) and half AG, BB, RR (red); (d) produces gametes ABlR and GBlR. These uniting with ABR (red) give half AA, BlB, RR (black) and half AG, BlB, RR (agouti). The remaining type (g) is pure agouti, and breeds true.

The above formulæ may seem complex at first, but they are really quite simple, and render the process of determining the character content of any cross and its progeny exceedingly easy.

One of the above crosses shows how two characters that are not allelomorphic to each other may still give the numerical relations in generation F_2 of a pair of allelomorphs. An individual having the color black may have the formula BlBl, RR, the red not being noticeable because indiscriminately mixed with, and concealed by, the black pigment. A red individual may have the formula AA, RR, in which A represents the absence of Bl. The respective gametes are BlR and AR; the hybrid being ABl, RR, which is black. The gametes produced by this hybrid are AR and BlR. Fortuitous union of these gives:

AR x AR = AA, RR (red)
AR x BlR = ABl, RR } (black-hybrids)
BlR x AR = ABl, RR }
BlR x BlR = BlBl, RR (black-pure)

This is clearly the same result, as far as color of progeny is concerned, as if Bl and R were a pair of allelomorphs. We know they are not, since in the pure agouti type both colors are present in such form as to be transmitted to all the progeny.

W. J. SPILLMAN
U. S. DEPARTMENT OF AGRICULTURE

NOTES ON ORGANIC CHEMISTRY

DIAZOAMINOMETHANE (DIMETHYLTRIAZINE)

MANY members of the important class of compounds known as the diazoamino derivatives are known, but these, hitherto, have all belonged to the aromatic series. Otto Dimroth[1] has, however, recently succeeded in isolating the first and lowest representative of the aliphatic division—*diazoaminomethane* or *dimethyltriazine*, as it may also be called, $CH_3N:NNHCH_3$. The compound is interesting not only for the reasons given, but also on

[1] *Ber. d. Chem. Ges.*, **39**, 3905 (1906).

account of its peculiar properties, which rendered its isolation and investigation a matter of extreme difficulty.

Sodium azoimide, NaN_3, when treated with dimethyl sulphate, yields methylazide,

$$CH_3N < \genfrac{}{}{0pt}{}{N}{\vdots \atop N},$$

and this, by the action of methylmagnesium iodide (Grignard's reagent) and water gives diazoaminomethane, which is a colorless liquid, melting at $-12°$. It is extremely reactive and is decomposed during the course of its preparation by the catalytic action of the small quantity of impurity usually present in magnesium. It boils at 92°, but promptly decomposes, volatilizes readily at the ordinary temperature, more rapidly at the boiling point of ether and is miscible in all proportions with every solvent. Acids convert it instantly into nitrogen, methylamine and the methyl ester of the acid. In dilute solution it has a sweet taste, but the pure compound rapidly cauterizes and blisters the skin, and its vapor, when inhaled, produces severe headache accompanied by a prolonged feeling of lassitude. Diazoaminomethane forms a *silver salt*, $CH_3N{:}NN(Ag)CH_3$, and a *cuprous salt*, $CH_3N{:}NN(Cu)CH_3$, the latter crystallizing in large, lustrous, yellow prisms. It is by means of this compound that the separation and final purification of the diazoaminomethane was effected.

J. BISHOP TINGLE
JOHNS HOPKINS UNIVERSITY

CURRENT NOTES ON METEOROLOGY

MOISTURE FROM CLOUDS

SOME interesting observations have lately been made by Marloth on the amount of moisture deposited by the S. E. trade clouds on vegetation growing on the summit of Table Mountain, South Africa (*Trans. So. Afr. Phil. Soc.*, XIV., Pt. 4, Oct., 1903; XVI., Pt. 2, Oct., 1905; *Met. Zeitschr.*, Dec., 1906). In this southwestern extremity of South Africa the winter is rainy and the summer dry. About three quarters of the annual precipitation falls in the six winter months, and in the three summer months (Dec.–Feb.) only about eight per cent., 2.16 inches, falls on the average. It occasionally happens that two months may pass without a drop of rain. The vegetation on the hills and on the lower slopes of the mountains clearly reflects the deficiency of summer precipitation, but on the mountains vegetation is much more abundant, and shows much more favorable conditions of moisture supply. The latter has been shown by Marloth to come from the clouds formed over the mountains in the S. E. trade wind. The plants collect the cloud drops in sufficient quantity, not only to keep themselves wet, but even to furnish enough water to produce a permanent swamp on the top of Table Mountain in winter, and a periodic swamp in summer. The summer swamp dries up during long spells of clear weather, but appears again when the S. E. cloud is formed. Small ponds actually form, sometimes even in late summer, on the top of Table Mountain. A photograph of a pond appears in Marloth's report. An interesting piece of evidence as to the effect of the water thus collected by vegetation is given in the note that in the case of a mountain stream in this region, which can furnish sixty horse-power, three days after a fire which burned off the bushes and grass at the head of this stream, the water furnished only twenty horse-power. The cloud on Table Mountain is a mixture of an ordinary cloud and very finely distributed rain-drops in process of formation. The whole mass moves at high velocity (the trade velocity is there often forty miles an hour), which prevents the fall of small drops. It is not until they come in contact with a solid object, and when the velocity is reduced, that the drops are held by the obstacle, and gradually reach the ground.

In connection with this phenomenon reference may be made to various suggestions that have been brought forward regarding the possible utilization of fog for the uses of vegetation in California (*Mo. Wea. Rev.*, Oct., 1898, 466; 1899, 301, 473); also to Hann's 'Handbook of Climatology' (English translation), 195–196.