that the few instances here studied give information only about the vertebrate eye. Cases of coloration among marine organisms are known which indicate color vision in anthropods, and the current explanation of the colors of flowers presupposes an ability of insects to discriminate color, but more information on this point is needed.

(2) Some animals have variable color and some at least of these make their own color response to visual stimuli. The most conspicuous example is the flat-fish. The very thorough studies of Mast and others establish the fact that this sees color, but no tests have been made to see whether, for instance, a red-green combination would be matched by its subjective equivalent, yellow. Here we have an animal which can actually be put through the same kind of psychological test that is applied to men. We ask it in effect, "What does this look like to you?" and tests can be made for after-image colors, contrast illusions, etc. Such tests seem likely to throw more light on color vision in animals than any other line that is now open. In this connection a point of technique in the use of color filters should be noted. It was said above that it is a matter of indifference whether the grass snake is illuminated with white light and viewed through the filter, or illuminated with the filtered light. This is true for an animal of fixed color, but it will be readily seen that the experience of the snake is different in the two cases, for in the second case it shares with the observer the color contrast produced. As a matter of fact the snake manifested no uneasiness at being thus rendered so startlingly conspicuous, indicating that color experience does not form a part of his ordinary response, though this can hardly be affirmed definitely on the basis of a single uncontrolled observation. In the case of an animal like the flat-fish, however, it is clear that the two methods of observation would lead to quite different results, for in the second case the fish would respond so as to make the contrast disappear as far as possible.

(3) Does color perception imply color *vision, i.e.,* are eyes essential to the process of color response? The question may seem absurd, but cases are cited in the literature of larvae forming chrysalides matching a background in which blinding the larvae did not alter the response. It may be that the underlying photochemical processes are here generalized in the skin instead of being confined to a specific end-organ. This would place color response on the same footing with most others, but the present meagre indications of fact must be widely corroborated and extended before any conclusions can be drawn.

(4) Do animals with dichromatic color vision exist? Is, for instance, the brilliant plumage of the cardinal really a contrast to the surrounding foliage for the eyes that are most concerned with finding him?

The writer hopes during the next and succeeding summers to continue work on some of the problems here raised.

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LONGEVITY IN THE SOUTHERN STATES

THE federal statistics of 1920 are very important because they afford the first satisfactory opportunity of estimating longevity in the southern states. It is true that southern states were added to the registration area for deaths a few years before 1920, but as population statistics are collected only at decennial intervals the year 1920 is the first year at which both mortality and population statistics of the southern states are directly available.

As the negro has so often been referred to as the most disturbing factor in the progress of this country the results of an investigation into the relative longevity of southern states whose populations include such large numbers of negroes should be of considerable interest and importance. The writer believes that the general feeling among those interested in the problem has been similar to his own that such results would prove alarming. If so, the results

of this paper will prove quite surprising, for if the statistics of these southern states are reliable longevity in the south compares very favorably with longevity in the north. Those of us who have felt considerable pride in comparing longevity in this country with longevity in other countries have always felt a mental reservation on account of the possible conditions in the south since the latter were never represented in the comparison. It affords great relief then to find evidence that longevity in the southern states with their large proportions of negro population not only compares favorably with longevity in the northern states but even excels in some cases; that is, longevity in some of the southern states seems to exeel quite significantly the longevity in some of the northern states. The writer hastens to add, however, that in his own estimation these conclusions are affected somewhat by consistent overstatements of advanced ages, at least, in most of the southern states. While it is impossible, of course, to measure the extent and effect of this tendency its existence is beyond question as is evidenced by the unnatural "bunching" of data in both the mortality statistics and the population statistics at the highest ages. However, the method followed in this investigation is one which minimizes inaccuracies at the most advanced ages, and considering that the first numerical measures of any natural phenomenon can be regarded only as first approximations the writer believes the numerical results given below to be very satisfactory for purposes of comparison with results obtained from other populations and drawing general conclusions therefrom.

The numerical results of this paper were ob-

MALES—EXPECTATION OF LIFE

Age	Ky.	Tenn.	Miss.	No. Car.	Va.	Florida	La.	So. Car.
10	54.2	52.5	51.0	52.1	51.8	50.1	50.0	49.5
20	46.1	44.6	44.5	43.9	43.7	42.3	42.1	41.6
30	38.5	37.4	37.7	36.7	36.3	35.2	34.9	34.6
40	30.7	30.2	30.4	29.5	29.0	28.2	27.9	27.8
50	23.0	22.9	22.9	22.2	21.8	21.5	20.9	20.7
60	15.9	16.0	15.8	15.3	15.0	15.2	14.8	14.2
70	10.1	10.3	9.9	9.4	9.4	9.8	9.6	8.9
80	5.8	6.0	5.8	5.4	5.5	5.6	5.6	5.3
Ave. Exp.	32.90	32.47	32.23	32.08	31.90	31.40	31.23	30.98

DEATH RATES PER 10,000

10	27	26	30	24	24	30	30	28
20	51	59	73	55	56	66	62	67
30	58	77	77	82	75	82	85	95
40	73	93	80	89	92	115	101	102
50	104	116	115	127	131	160	164	151
60	219	224	212	222	253	267	294	286
70	504	486	496	532	549	529	559	594
80	1086	1070	1202	1296	1312	1121	1153	1438

FEMALES—EXPECTATION OF LIFE

Age	Ky.	Tenn.	Florida	La.	Miss.	Va.	No. Car.	So. Car.
10	53.0	51.2	51.2	50.6	49.7	50.2	50.3	48.3
20	45.0	43.5	43.2	42.5	42.3	42.3	42.3	40.6
30	37.8	36.8	36.2	35.6	35.8	35.4	35.4	34.2
40	30.7	30.1	29.4	29.0	29.3	28.6	28.8	27.9
50	23.1	23.1	22.6	22.2	22.6	21.7	22.0	21.4
60	16.1	16.3	15.9	15.7	16.0	15.3	15.1	15.1
70	10.3	10.5	10.2	10.2	10.2	10.0	9.2	9.9
80	6.0	6.2	6.0	6.1	6.0	5.9	5.4	6.6
Ave. Exp.	32.68	32.20	31.97	31.72	31.68	31.50	31.48	30.98

DEATH RATES PER 1,000

10	26	28	25	25	33	27	23	29
20	58	69	64	63	78	66	65	80
30	83	97	89	97	103	94	98	112
40	80	100	107	108	110	107	116	127
50	111	132	138	152	149	147	127	160
60	219	210	226	256	219	270	234	270
70	475	475	502	500	489	517	521	564
80	1083	1063	1075	1098	1101	1128	1474	1237

tained by constructing abridged mortality tables from the mortality and the population statistics of 1920 of each of the eight southern states, Kentucky, Tennessee, Mississippi, North Carolina, Virginia, Florida, Louisiana and South Carolina for both the males and the females. Tables were constructed for both sexes also for the eight states taken as a whole and likewise for the ten northern states Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island and Vermont. Twenty abridged mortality tables then were constructed. The mortality tables themselves are not given, as practically nothing can be deduced from them which can not be deduced from the tables of expectations of life and death rates on the preceding page.

It will be noticed that the records of the various states vary in different ways at different ages; that is, one state may show up better at one interval of ages and another state at another interval. For that reason it is not easy to arrange the states according to their proper standing, as was attempted here. The scheme followed here was to compute what might be called the *average* expectation of life which is merely the average of the expectations of life at the given ages weighted by the number living at those ages as given by the abridged mortality table.

No detailed discussion of the expectations of life and the death rates at the different ages for the different states seems necessary. It is interesting to note, however, the excellent results of Kentucky and Tennessee, particularly Kentucky. Several years ago, the writer investigated the longevity of native Americans of native parentage and expressed then his belief that their record of longevity would compare favorably with the longevity of any other nationality. Measures of that longevity are closely approximated by the expectations of life for Kentucky. As the expectation of life at age 10 closely approximates that at age of birth in most mortality tables the expectation of 54.2 years for the males and 53.0 years for the females might be regarded as approximations of the average span of life of the two sexes in that state. It should be noticed that longevity in Kentucky seems to excel the average results for the ten northern states (see below) to a considerable extent. It is very remarkable that the records of the males seem to excel those of the females in five of the eight southern states (*i. e.*, in Kentucky, Tennessee, Mississippi, North Carolina and Virginia).

It is interesting to compare the expectations of life and the death rates of the ten northern states and of the eight southern states.

EXPECTATION OF LIFE

	MALES		FEMALES	
	North	South	North	South
10	52.3	51.7	52.9	50.7
20	44.0	43.8	44.6	42.9
30	36.1	36.5	36.9	36.1
40	28.4	29.3	29.3	29.4
50	21.0	22.1	21.8	22.4
60	14.3	15.3	14.9	15.7
70	9.0	9.8	9.5	10.1
80	5.2	5.7	5.5	6.0
Ave. Exp.	31.76	32.00	32.17	31.85

DEATH RATES PER 10,000

	MALES		FEMALES	
	North	South	North	South
10	30	27	26	27
20	45	60	46	67
30	62	77	69	96
40	83	92	81	106
50	132	130	122	132
60	281	246	249	237
70	604	526	568	502
80	1332	1191	1225	1124

It will be noticed that the expectation of life of the males of the northern states excel those of the males of the southern states only at ages 10 to 20 and that the average expectation of life of the southern males exceeds that of the northern males. It is a very interesting question to what extent the indicated superiority of the southern males at ages 30 and beyond is due to overstatement of ages. With the very worst interpretation comparison of the death rates of the two groups shows that the south compares very favorably with the north. The females of the two groups compare much the same way but the beginning of the indicated superiority of the southern females appears at a later decennial age than in the case of the males and hence the northern females show a slightly greater average expectation of life. It should be noticed that the southern males excel the southern females in the average expectation and in the expectation of life and

death rates at the earlier ages. Again it would be interesting to know whether and to what extent the indicated superiority of the southern females at the advanced ages is due to overstatement of advanced ages.

It should be stated that no scheme of smoothing of data was employed in computing the death rates given in the tables above and that the computation of each death rate was essentially independent of that of any other. In the light of this fact the absence of significant incongruities and the general agreement of the various numerical results at the different ages of all twenty mortality tables is rather remarkable. It is only hoped that the evidences of overstatement of advanced ages—and the northern states are not wholly beyond criticism in this respect—will gradually disappear. It should also be added that since all of these mortality tables were constructed from the statistics of a single year (1920) the results given above are offered merely for purposes of comparison and *general* conclusions.

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SCIENTIFIC EVENTS

SAFETY CODE FOR AUTOMOBILE BRAKES

A NATIONAL safety code for automobile brakes and brake testing will be developed under the auspices of the American Engineering Standards Committee as the result of the decision of a special committee consisting of representatives of the American Automobile Association, the Motor Vehicle Conference Committee, the Conference of Motor Vehicle Administrators, the American Society of Mechanical Engineers, the United States Bureau of Standards, the United States War Department, the Society of Automotive Engineers, the Underwriters Laboratories, the Safety Group of the American Engineering Standards Committee and David Beecroft of the Class Journal Company. David Van Schaack, vice-president of the National Safety Council, was chairman of the committee.

The American Engineering Standards Committee has asked the Society of Automotive Engineers, the Bureau of Standards and the American Automobile Association to act as joint sponsors for the development of this code. The actual work of formulating the code will be carried on by a sectional committee representative of all the interests concerned with the problems of automobile brakes either as administrative officers, users, producers or general public.

The need for a national safety code covering methods of testing brakes and also those elements of brake or brake lining construction which are accident factors is emphasized by the increasing tendency toward state and municipal legislation on this subject. Several states already have brake testing laws and in a number of other states such laws are being drafted. There is, however, no agreement at present as to what is a safe braking distance or what constitutes a satisfactory braking test. Until a national safety code has been developed and generally accepted the motorist driving from one city to another or from state to state will have no assurance that brakes approved in one city will not bring a fine in the next town or state.

THE AUSTRALIAN NATIONAL RESEARCH COUNCIL

THE Australian National Research Council has issued a report of its annual meeting held in Sydney in August last which is summarized in *Nature*. The council was formed for national and international purposes in January 1921 by the Australian Association for the Advancement of Science, to which body it has to submit a full report of its work and proceedings on the occasion of each meeting of the Association. At the meeting Sir David Orme Masson was elected president of the council in succession to Sir Edgeworth David. Resolutions were passed urging the need for the State endowment of systematic research in the Pacific islands under Australian control, for research work in Australia in respect of refrigeration, and for laboratories to carry out industrial investigation and research. Offers of co-operation with the Commonwealth Institute of Science and Industry in measures for furthering these objects were made, and preliminary steps taken for the inauguration of a publicity campaign for the purpose of securing that the functions, operations and financial needs of the