second, the right isomer readily falls into the two sexual phases, while the left does so comparatively rarely.

The organizing process of molecules at the forward end of the moving ameba is, in consequence, assumed to be accompanied by the formation of fields which derive their characteristics from the nature of the molecules; for there can be no (spontaneous) molecular organization without an accompanying field (comprising sub-fields). This field is the "organized aspect" of the organism. It follows from this that not only some but most or all of the characteristics of the organism are due to, or rather *correlated with positional relationships of the molecules,* and ultimately with the stereo-relations of the atoms of the molecules. It is, in fact, theoretically unique to suppose that a mass of matter, of whatever size, in a system (such as a molecule or an organism) can give rise to a particular characteristic of that system; for the characteristics of such systems as we know about are commonly held to be due to number and positional relationships of the constituent particles.

The experimental data on the amebas, on which the hypothesis of molecular organization is specifically based, will soon be published in full.

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CERCOSPORELLA HERPOTRICHOIDES FRON, THE CAUSE OF THE COLUMBIA BASIN FOOTROT OF WINTER WHEAT

DURING the past eleven years an important footrot of winter wheat and barley has been under investigation in eastern Washington and Oregon. The symptoms already have been described in part.[1] An undetermined fungus, producing sterile, moderately slow-growing, compact, smoke-gray, mycelial colonies on Difco potato-dextrose agar, has been consistently isolated from young lesions that occur in the basal nodes of the culm. In special studies with this fungus conducted by the writer during the fall and winter of 1929 and again in the fall of 1930, at Corvallis, Oregon, the fungus sporulated profusely when grown on cornmeal and incubated outdoors. The fungus proved to be *Cercosporella herpotrichoides* Fron. Conidia were produced in slimy, pink masses, or pseudopionnotes, at the edges of colonies four weeks old. Conidia were developed also on loosely formed coremium-like structures, on sporodochia or microsclerotia, and to some extent on independent hyphae. The spores germinated at one or both ends and, in less than a week, produced the characteristic, smoke-gray colonies on Difco potato-dextrose agar.

Early in the spring of 1930, spores of *Cercosporella herpotrichoides* were found on lesions at the bases of culms of naturally infected wheat plants in the field near The Dalles, Oregon, and also on artificially inoculated wheat plants in the greenhouse at Corvallis, Oregon.

Artificial inoculations on wheat were made, in 1929 and 1930, in the greenhouse and in the field at Corvallis, Oregon, and in the field at three different points in and near The Dalles, Oregon. The fungus was carried through five mono-mycelial transfers before starting the pathogenicity tests. As inoculum for pathogenicity tests, the fungus was grown in quantity in flasks on a sterilized mixture of oats and barley kernels. In making the inoculations the fresh

TABLE 1

RESULTS OF INOCULATING WHEAT PLANTS WITH *Cercosporella herpotrichoides* AT CORVALLIS AND THE DALLES, OREGON, 1929–1930

Location	Distance from nearest known naturally infected area, miles	When inoculated	Results obtained
Corvallis, Ore.:			
In greenhouse	120	At time of seeding, Oct., 1929, to Feb., 1930 Oct., 1930, to Jan., 1931	Typical footrot symptoms and also stunting and frequent death of seedlings
On college farm	120	Jan. 3, 1930, 1 month after seeding	Typical footrot symptoms, including falling of culms
The Dalles, Ore.:	2		
In the country, elevation 2,800 feet		Oct. 10, 1929, 6 weeks after seeding	Typical footrot symptoms except no falling
In the country, elevation 2,200 feet	5	Oct. 10, 1929, 6 weeks after seeding	Typical symptoms, including falling
In a garden in The Dalles, elevation 150 feet	10	March 15, 1930, 5 months after seeding	Footrot lesions near maturity

[1] H. H. McKinney, "Footrot Diseases of Wheat in America," U. S. Dept. Agr. *Bull.* 1347: 28–30, 1925.

inoculum was crumbled and mixed into the soil at seeding time or later. The results of these inoculations are given in Table 1. In each case, uninoculated wheat plants grown as controls remained healthy throughout and the characteristic *Cercosporella herpotrichoides* was isolated from diseased wheat plants from the inoculated series at each place.

In a paper by Fron[2] in 1912, it is held that *Cercosporella herpotrichoides* Fron is the conidial stage of *Leptosphaeria herpotrichoides* De Not. However, in a subsequent paper, Foëx,[3] unable to substantiate Fron's claim, holds that the two fungi are not genetically connected. In a recent paper by Foëx and Rosella,[4] an undetermined fungus from "eye-spot" lesions (le champignon des taches ocellées) is described that agrees, in cultural characters, with the *Cercosporella herpotrichoides* being studied by the writer. Foëx and Rosella designate their organism as "champignon X." They also found *Cercosporella* spores similar to *C. herpotrichoides* on wheat plants grown in soil artificially inoculated with "champignon X." These writers state, however, that it is still uncertain whether "champignon X," the undetermined "eye-spot" fungus, belongs to this species or not. Dr. Foëx recently sent the writer transfers of a pure culture of "champignon X" and it proves to be microscopically identical with the pure cultures of *Cercosporella herpotrichoides* isolated by the writer from diseased wheat in Oregon.

The only ascigerous stage of a suspected parasite that has been found on wheat footrots in the Columbia Basin area, aside from traces of *Ophiobolus graminis,* is a small amount of *Leptosphaeria herpotrichoides* De Not. found by McKinney[5] in Spokane County, Washington. A culture of a *Leptosphaeria* sent from Canada, referred to by Henry and Foster,[6] is distinct in appearance, on potato-dextrose agar, from the *Cercosporella herpotrichoides* studied by the writer and similarly different also from the culture received by the writer from Dr. Foëx. The *Leptosphaeria* from Canada also differs from *C. herpotrichoides* in rate of growth on agar, at room temperatures, and in pathogenicity.

Fron did not give a formal technical description of *C. herpotrichoides* when he named the fungus, and correspondence[7] has failed to locate any type material. Fron's discussion and drawings lead the writer to conclude, however, that the fungus causing the Columbia Basin footrot is taxonomically identical with *Cercosporella herpotrichoides* Fron. Because of its prevalence in literature, the writer prefers to retain Fron's name and submits the following emended description based on the fungus as it occurs in Washington and Oregon.

CERCOSPORELLA HERPOTRICHOIDES FRON. (EMENDED)

Fawn color to white, brown-bordered elongate (rarely circular) spots up to 3 cm in length, occurring on outer leaf sheaths at base of culms, later penetrating into interior of stems in spring of year or earlier, causing light-colored, later brown to black, charred-appearing lesions at the ground level, rarely higher; margins of lesions dark brown to golden brown; tissue of lesions firm and brittle, later sunken, culms eventually falling.

Mycelia septate, of two sorts: (1) Vegetative, yellow to dark brown, linear-celled; (2) stromatic, medium to very heavy walled, frequently consisting of polygon-shaped cells forming charred masses on the outside of stems or sheaths or occurring in cells in the interior of attacked culms. Conidiophores simple to slightly branched, sometimes swollen at the base and elongated, produced from macrohyphae subicula. Spores usually produced in spring of year on spots or lesions, frequently in pairs, often singly, somewhat curved, obclavate, two to several celled (mostly 5 to 7), variable, 1.5–3.5 x 30–80 μ (mostly 40–60 μ). On cornmeal (*Zea mays*), sporulation occurs in cool fall or winter weather, spores are produced in pseudopionnotes, coremia and loosely-formed sporodochial pads; spores strongly obclavate, blunt, sometimes pointed at apex, cells sharply constricted, somewhat doliform, 1.5–3.5 x 20–45 μ; on potato-dextrose agar, spores germinate usually from terminal cells but sometimes from any cell, and produce smoke-gray colonies of compact mycelia.

On culms of *Triticum vulgare* Vill. and *Hordeum vulgare* L. in Oregon, Washington and Idaho.

Material from natural infection on C. A. Johnson farm, High Prairie, Klickitat County, Washington, and material in pure culture on cornmeal from monomycelial transfers from scattered areas in the Pacific Northwest have been deposited in the mycological

[2] G. Fron, "Contribution à L'Etude de la Maladie 'Pied Noir des Cereales,' ou 'Maladie du Pietin,'" *Ann. de la Sci. Agron Francaise et Etrangere,* Année 29 (Sér. 4, Annee 1), Sem. 1: 3–29, 1912.

[3] Et. Foëx, "Note sur le Pietin du Blé," *Bul.* de la Soc. Path. Veg. de France, 6: 52–56, 1919.

[4] Et. Foëx, and Et. Rosella, "Sur les diverses formes du pietin," *Rev. Path. Veg. et Ent. Agric.,* 17: 41–51, February, 1930. [Abs. in Rev. Appl. Myc., 9: 640–641, 1930.]

[5] H. H. McKinney, *loc. cit.*

[6] A. W. Henry and W. R. Foster, "Leptosphaeria Footrot of Wheat in Alberta," *Phytopath.,* 19: 689–690, 1929.

[7] The writer is indebted to Miss E. M. Wakefield, of the Royal Botanic Gardens, Kew, England, Dr. Geo. H. Pethybridge, of the Ministry of Agriculture, England, and to Dr. Et. Foëx, Institut des Recherches Agronomiques, Versailles, France, who so kindly assisted the writer in searching for type material of *C. herpotrichoides.* The writer also is indebted to Dr. Foëx for exchange cultures of footrot causing fungi.

collections of the Bureau of Plant Industry, U. S. Department of Agriculture.

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IN COOPERATION WITH THE
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THE SEX RATIO AMONG HUMAN STILLBIRTHS

IT has long been known that among human births there is a marked and fairly constant excess of males over females, the observed sex ratio for living births in the United States, for example, being about 105 or 106 males per 100 females. This surplus of males at birth might be explained by postulating a higher intra-uterine death-rate for females than for males. An examination of the sex ratio among stillbirths,[1] however, does not support this view; on the contrary, it discloses an even greater excess of males among those gestations which are interrupted prematurely than among those which terminate in normal, living births. The published data on this subject are adequately summarized in a paper by Holmes and Goff[2] and by Schultz[3] in his comprehensive study of the sex incidence in abortions, to which the reader is referred for a more detailed discussion of the matter.

The purpose of this paper is to call attention to the sex ratio computed from official statistics[4] covering 51,810 stillbirths which occurred in a selected area[5] of the United States, during the years 1926, 1927 and 1928. In Table I these cases are arranged according to their recorded sex and age. To aid in

TABLE I

STILLBIRTHS FROM A LIMITED AREA* OF THE UNITED STATES DURING 1926, 1927 AND 1928, SHOWING THE NUMBER OF MALES AND FEMALES AND THE SEX RATIO, ARRANGED ACCORDING TO THE PERIOD OF UTERO-GESTATION

	Under 4 months			4 months		
	♂	♀	Sex ratio	♂	♀	Sex ratio
1926	170	52	326.92	359	165	217.57
1927	222	58	382.75	405	196	206.63
1928	205	57	359.64	470	192	244.79
Total	597	167	357.48	1,234	553	223.14

	5 months			6 months		
	♂	♀	Sex ratio	♂	♀	Sex ratio
1926	678	473	143.34	881	653	134.91
1927	756	541	139.74	1,096	868	126.26
1928	839	617	135.98	1,117	879	127.07
Total	2,273	1,631	139.36	3,094	2,400	128.91

	7 months			8 months		
	♂	♀	Sex ratio	♂	♀	Sex ratio
1926	1,052	941	111.79	1,184	989	119.71
1927	1,364	1,144	119.23	1,486	1,113	133.51
1928	1,340	1,136	117.95	1,421	1,164	122.07
Total	3,756	3,221	116.60	4,091	3,266	125.26

	9 months			10 months		
	♂	♀	Sex ratio	♂	♀	Sex ratio
1926	4,278	3,107	137.68	205	126	162.69
1927	5,088	3,712	137.06	186	126	147.61
1928	4,864	3,535	137.59	175	125	140.00
Total	14,230	10,354	137.43	566	377	150.13

SUMMARY

Age	♂	♀	Sex ratio
Less than 4 months	597	167	357.48
4 months	1,234	553	223.14
5 months	2,273	1,631	139.36
6 months	3,094	2,400	128.91
7 months	3,756	3,221	116.60
8 months	4,091	3,266	125.26
9 months	14,230	10,354	137.43
10 months or more	566	377	150.13
Total	29,841	21,969	135.83

* Including Connecticut, Illinois, New Jersey, Oregon, Utah, Washington, Baltimore, Maryland, District of Columbia, and New York. (Figures for 1927 and 1928 include the entire state of New York; those for 1926 are for New York City only.)

[1] As employed by U. S. Bureau of the Census, the term "stillbirth" apparently includes all interruptions of pregnancy, regardless of their cause or the period at which they occurred.

[2] S. J. Holmes and J. C. Goff, "The Selective Elimination of Male Infants under Different Environmental Influences," "Eugenics in Race and State," II, 247–248, Baltimore, Williams and Wilkins Company, 1923.

[3] Adolph H. Schultz, "Sex Incidence in Abortions," Carnegie Institution Publication No. 275, Washington, 1921.

[4] Birth, Stillbirth and Infant Mortality Statistics for the Birth Registration Area of the United States, 1926, 1927 and 1928.

[5] Including Connecticut, Illinois, New Jersey, Oregon, Utah, Washington, Baltimore, Maryland, District of Columbia and New York. (Figures for 1927 and 1928 include the entire state of New York; those for 1926 are for New York City only.)