



Photograph courtesy of Dr. R. Brattner

#### A MODEL OF A LIFE PROCESS

Frontispiece

Life processes can be studied by constructing physico-chemical models that reproduce various vital functions, and by studying how these functions are produced. The above photograph shows such a non-living model of growth processes,—fibers “growing” from a lipid into the surrounding watery medium. While such fibers have an astonishing resemblance to some living organisms, they exhibit only a few of the properties of protoplasm. They may be taken to show, however, that the explanation of the phenomena of growth does not necessitate the evocation of any mysterious “vital forces” different from the forces studied by physicists and chemists. It has been said that life in all its complexity is “only one of the innumerable properties of the compounds of carbon,” though laboratory proof of this is still far from complete. (See “The Physics and Chemistry of Life,” page 269.)

## THE GERMAN STERILIZATION LAW

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GERMANY'S eugenic sterilization law, which went into effect on January 1, 1934, is no hasty improvisation of the Nazi regime. It has been taking shape gradually during many years, in the discussions of eugenicists. From one point of view, it is merely an accident that it happened to be the Hitler administration which was ready to put into effect the recommendations of specialists.

But Hitler himself—though a bachelor—has long been a convinced advocate of race betterment through eugenic measures. Probably his earlier thinking was colored by Nietzsche, but he studied the subject more thoroughly during his years in prison, following the abortive revolutionary movement of 1923. Here, it is said, he came into possession of the two-volume text on heredity and eugenics, by E. Baur, E. Fischer, and F. Lenz, which is the best-known statement of eugenics in the German language, and evidently studied it to good purpose. In his book, *Mein Kampf*, most of which was written during these prison years, and which outlines most of the policies since adopted by the Nazis as a political party, he bases his hopes of national regeneration solidly on the application of biological principles to human society.

“He who is not sound and worthy in body and mind, should not perpetuate his handicaps in the bodies of his children,” Hitler declares in this book.

“The state must take care that only he who is sound shall be a parent.

“To prevent defective persons from producing equally defective offspring, is an act dictated by the clearest light of reason. Its carrying out is the most human act of mankind. It would prevent the unmerited suffer-

ing of millions of persons, and above all would, in the end, result in a steady increase in human welfare.”

That he has no illusions about producing immediate and miraculous results, but is taking the long time view, is evidenced by his remark that, “If for only 600 years the reproduction of the physically defective and mentally diseased were prevented, not only would mankind be freed from an unmeasurable misery, but it would reach a vigor which today is hardly dreamed of.

“In an age when races are poisoning themselves,” he concludes, “any state which devotes itself to the care of its best racial elements must some day dominate the earth.”

He recognizes, however, that negative measures are not enough to safeguard the racial values of a people. There must be an encouragement of sound parenthood, and he declares that “the fertility of sound women must not be limited by the disgusting materialism which transforms the blessing of children into a curse for their parents.” While he points clearly to the need for financial reforms, such as the family wage, he seems to lay the greatest stress on educational changes and reforms in public opinion, that will promote earlier marriage and larger families among the fit.

Since the Nazis came into full power, changes have been so frequent that it has been difficult to keep track of them. The sterilization law was one of the first eugenic measures to be adopted. Its text, in full, is as follows:

#### SECTION 1

(1) Anyone with hereditary disease may be rendered sterile by surgical means, when, according to medical experience, it is highly probable that the offspring of such person will suffer from severe inherited mental or bodily disorders.

(2) The law applies to all who suffer



from any of the following diseases:

1. Congenital feeble-mindedness.
2. Schizophrenia (dementia praecox).
3. Manic-depressive insanity.
4. Inherited epilepsy.
5. Huntington's chorea.
6. Hereditary blindness.
7. Hereditary deafness.
8. Severe hereditary malformation.

(3) Also, anyone with severe alcoholism may be sterilized.

#### SECTION 2

(1) Anyone in need of sterilization may voluntarily ask for such operation. If the subject is incompetent or mentally weak, or if he has not yet completed the 18th year, his legal representative must intervene and obtain the approbation of the Court of Wards (Vormundschaftsgericht, minor's court). In other cases of limited competence the assent of the legal representative is necessary. In the case of an adult for whom a guardian has been appointed, the consent of the latter must be obtained.

(2) To the application, the certificate of a physician licensed to practice in Germany is to be appended, stating that the person to be sterilized has had the purpose and consequences of sterilization explained to him.

(3) The application can be withdrawn.

#### SECTION 3

Sterilization can also be proposed by:

1. The official physician.
2. For inmates of a hospital, sanatorium, or nursing home or a prison, the director.

#### SECTION 4

The proposal is to be presented to the office of the Eugenics Court (Erbgesundheitsgericht) in writing, or dictated to its clerk. The facts on which the proposal is based are to be certified by a medical report, or verified in some other manner. The Clerk of the Court has to notify the official physician of the proposal.

#### SECTION 5

The Eugenics Court of the district in which the person to be sterilized has his legal residence, will have jurisdiction in the case.

#### SECTION 6

(1) The Eugenics Court is to be attached to a Magistrate's Court. It shall consist of a Magistrate as chairman, an official physician, and another physician licensed to practice in Germany, who is especially conversant with the principles of eugenics. Every member must have an alternate.

(2) As chairman, no one can officiate who has approved a proposal according to Section 2, No. 1. If an official physician has made the proposal he can not take part in the decision.

#### SECTION 7

(1) The procedure before the Eugenics Court is not public.

(2) The Eugenics Court has to institute the necessary investigation; it can examine witnesses and experts, can order the personal appearance and medical examination of the person to be sterilized, and can have the latter brought in case of unexcused absence. For the examination and administering of oaths to witnesses and experts, and for the exclusion and excusing of the Court personnel, the rules of civil procedure are to be followed. Physicians called as witnesses or experts are obliged to testify without regard to professional secrecy. Officials of the Court and of other departments of the government, and also hospitals, have to give information to the Eugenics Court on request.

#### SECTION 8

The Court is to make an unbiased decision on the basis of all the facts and testimony. The decision is to be formulated after oral discussion, and by a majority vote. It is to be in writing, and signed by those members of the Court who approved it. It must give the reasons for which sterilization is ordered or denied. The decision shall be communicated to the proposer, to the official physician, and to the person to be sterilized, or in case the latter is not legally competent, to his legal representative.

#### SECTION 9

Within one month after the judgment, any of the persons indicated in the foregoing section can appeal in writing, or dictation at the office of the Eugenics Court. Such appeal effects a postponement. The Eugenics Superior Court decides on the appeal. If no appeal is entered, the case returns to its previous status in accordance with the rules of civil procedure.

#### SECTION 10

(1) The Eugenics Superior Court is attached to a district Superior Court, the two jurisdictions being co-extensive. It consists of a member of the Superior Court of the district, an official physician, and another physician licensed to practice in Germany and especially familiar with eugenics. Every member is to have an alternate. Section 6, No. 2 applies.

(2) Sections 7 and 8 apply to the procedure of the Eugenics Superior Court.

(3) The decisions of the Eugenics Superior Court are final.

#### SECTION 11

(1) The surgical operation necessary for sterilization can be performed only in a hospital, by a physician licensed to practice in Germany. The physician can undertake the operation only after the legal

steps have been completed. The administrative officials designate the hospitals and the physicians for the performance of the operation. The operation can not be done by a physician who proposed it, or who took part in the legal procedure.

(2) The operator has to give the official physician a written report on the sterilization, with details of the method followed.

#### SECTION 12

(1) If the Court has given final decision for sterilization, the operation is to be performed even against the will of the person concerned, unless the latter alone voluntarily made the proposal. The Commission may obtain necessary assistance from the Police Officials. If other measures do not suffice, the use of force is permitted.

(2) If circumstances seem to require a new investigation of the situation, the Eugenics Court shall reopen the procedure, and in the meantime forbid the operation. If a proposal of sterilization has been denied, it can be filed again only if new evidence is submitted.

#### SECTION 13

(1) The costs of the legal proceedings are borne by the State Treasury. The costs of the surgical operation are borne by the Sickness Insurance Fund in case the person concerned is insured, for other indigent persons by the budget for public charity. In all other cases, the cost up to the minimum of the medical fee list, and the average charge for care in public hospitals, is borne by the State Treasury, any cost above that by the person sterilized.

#### SECTION 14

A sterilization not performed according to this law, as well as a removal of the reproductive glands, is only permissible when a physician removes the glands according to the rules of medical science to lessen serious danger to the life or health of the person operated upon, and with the permission of the latter.

#### SECTION 15

(1) All persons taking part in the legal steps or the surgical operation are bound to secrecy.

(2) Anyone who illegally transgresses the obligation of silence, shall be punished by imprisonment up to one year, or a fine. Prosecution can only ensue on a complaint. The complaint may be made by the presiding officer.

#### SECTION 16

(1) It is the duty of the State Government to enforce the provisions of this law.

(2) The Supreme Authority of the

State determines the seat and district of the deciding court in accordance with the provisions of Section 6, No. 1, sentence 1, and Section 10, No. 1, sentence 1. It names the members of the Commission and their alternates.

#### SECTION 17

The Minister of the Interior, in agreement with the Minister of Justice, issues the necessary regulations and rules of procedure for the administration of this law.

#### SECTION 18

This law goes into effect January 1, 1934.

The administration of this law is being carried out in the light of the regulations and forms officially prepared, together with full and explicit data to guide the courts in deciding who is to be declared hereditarily handicapped. All this material fills a substantial volume.\*

Progress in setting up this machinery has been slow, calling forth a number of complaints and admonitions from the administration; but in this delay is evidence that the government is doing its best to set up the necessary 1,700 tribunals carefully and to avoid serious mistakes. While the German law is well drawn and, in form, may be considered better than the sterilization laws of most American states, the success of any such measure naturally depends on conservative, sympathetic, and intelligent administration. Apparently the Nazis are doing their best to prevent criticism on this score, no doubt with the realization that their actions are regarded with suspicion in many quarters.

Newspaper accounts have generally said that 400,000 people are to be sterilized under this law. The statement appears to be unfounded. What German authorities have said is that about 400,000 people would be examined, to determine whether they should be sterilized. This number of course includes the inmates of all hospitals for the mentally diseased,

\*Gütt, Arthur, Rüdin, Ernst, and Rutke, Falk. *Gesetz zur Verhütung erbkranken Nachwuchts von 14 Juli, 1933, mit Ausführungsverordnung, Erläuterungen, etc.* Pp. 272. Munich, J. F. Lehmann's Verlag, 1934.



institutions for the mentally deficient, homes and asylums for the blind, deaf, and other defectives, and the inmates of all prisons. Naturally, not all of these will be sterilized, though all will be examined with that in view. The first reports from hospitals for mental diseases indicate that about one-third of the inmates are being certified for sterilization. The regulations governing the administration of the sterilization law provide among other things that no one shall be sterilized who because of age or other reasons is not capable of reproduction, or when such an operation would endanger his life. It is further provided that anyone who is in an institution need not be sterilized so long as he remains there.

This provision is a particular aid to the Roman Catholics, who have been combating the sterilization law. Although Hitler himself is a Roman Catholic, that church, as everyone knows, has been the source of a large part of his opposition, and it has taken a strong stand against sterilization in Germany. In order to avoid difficulties, the government came to a more or less official understanding with the representatives of the Vatican, under which (1) no Roman Catholic judge shall be asked to sit on a sterilization court, (2) no Roman Catholic surgeon shall be asked to perform an operation for eugenic sterilization, and (3) no Roman Catholic, otherwise liable to sterilization, shall be sterilized so long as he remains in an institution, at the expense of his family or at the expense of the church. In pursuance of this policy, the church was invited to establish additional institutions, in which its defective members might be taken care of.

Hitler is surrounded by men who at least sympathize with the eugenics program. The various private associations in the field of eugenic education have been reorganized as governmental agencies. The Minister of the Interior has established a com-

mission of experts on population policy, which is elaborating further measures to be adopted. These will doubtless include far-reaching provision for equalizing the economic burdens of the family. Dr. Gütt, in charge of public health measures in the Reich, is also an ardent eugenicist.

Among other changes, Dr. Fritz Lenz of Munich was called to the University of Berlin, where a full professorship of eugenics was established for him. He also took over the direction of the eugenic section of the Kaiser Wilhelm Institute for Anthropology, Human Heredity, and Eugenics, at Berlin. This was originally a private endowment, established largely through the activities of Dr. Hermann Muckermann, the eminent Roman Catholic eugenicist. As a former Jesuit, and a devoted adherent of the Roman church, Dr. Muckermann evidently could not work successfully with the Nazi regime.

The policy of the present German government is therefore to gather about it the recognized leaders of the eugenics movement, and to depend largely on their counsel in framing a policy which will direct the destinies of the German people, as Hitler remarks in *Mein Kampf*, "for the next thousand years." Whether this policy will be carried through successfully, of course remains to be seen. At best, mistakes will be inevitable. But the Nazis seem, as this scientific leadership becomes more and more prominent in their councils, to be avoiding the misplaced emphasis of their earlier pronouncements on questions of race, and to be proceeding toward a policy that will accord with the best thought of eugenicists in all civilized countries.

In any case, the present German government has given the first example in modern times of an administration based frankly and determinedly on the principles of eugenics. It has thus posed the question in a way that no other people can ignore.

## TWISTED WHEAT AND TWISTED TREES

### Twisting of the Rachis of Wheat Heads by Short Daily Photoperiods Suggests a New Approach to Studies of Twisted Trees

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**D**URING the past four years several observers have published on the twisting of the trunks and branches of trees. These papers have dealt with observations, and in some instances there have been discussions as to the possible cause of twisting. The writers are presenting the results of tests with an abnormal twisting of the rachis which occurs in certain varieties of wheat when grown under suitable conditions.

During the spring of 1930 it was found that many plants of Harvest Queen wheat developed very long twisted internodes at the lower portion of the rachis of the heads when the plants received light for eight hours daily. Other tests have shown that this twisting occurs in this variety when the daily photoperiod is twelve and one half hours in length during the autumn. Twisting has occurred in Siberian spring wheat when the summer day was reduced to thirteen hours of light. Examples of twisting are illustrated in Figure 1. Twisting has not occurred when the daily photoperiod was fourteen hours or more in length.

Twisting has been associated with the elongation of the internodes at the base of the rachis. In some instances this elongation is slight, but in others the lowermost internode has measured as much as 6 inches. A few specimens have been observed in which elongated internodes were not twisted. These internodes have been twisted as many as two and one half revolutions. Frequently the entire rachis is twisted, and sometimes the complete stem is twisted, but the latter condition is not frequent.

The direction of the twist of the ra-

chis seems to be influenced by some condition arising in the separate stalks as single plants have been found to produce heads with dextrorse (left to right) twists as well as heads with sinistrorse (right to left) twists. Counts on 15 heads from 4 plants of Marquis wheat showed 9 heads with no twists, 3 with dextrorse, and 3 with sinistrorse twists. Counts on 66 heads from 17 plants of Harvest Queen wheat showed 15 heads with no twists, 25 with dextrorse, and 26 with sinistrorse twists. In 7 of the Harvest Queen plants both directions of twisting were present on the same plant, and in 2 of these plants some of the stalks produced heads which had no twists.

In Table I it will be observed that 4 of the varieties tested did not develop twisted heads when grown under condi-

TABLE I. Characteristics of wheat varieties with respect to twisting of the internodes of the rachis when the plants were cultured with a daily photoperiod of eight hours until after heading. Temperatures during the night were 70 to 75° F. During the day they went to 80° F. or slightly above when the sun was bright.

Varieties	Lower internodes of the rachis elongated and twisted*
<i>Spring</i>	
Baart .....	+
Bunyip .....	—
Federation .....	+
Hard Federation .....	+
Marquis .....	+
Prelude .....	—
Quality .....	—
Reward .....	+
Sevier .....	+
Sonora .....	+
<i>Winter</i>	
Harvest Queen .....	+
Rising Sun .....	—
Turkey .....	+

\*Plus signs in the column signify twisting and the minus signs signify no twisting.