

The relationship of the different conjugated members to the quenching effect has been studied. Fatty acid mixtures having *different* proportions of isomers with 2, 3, 4, 5 and 6 conjugated double bonds were obtained by conjugation or by treatment of conjugated mixtures with heat, oxygen,

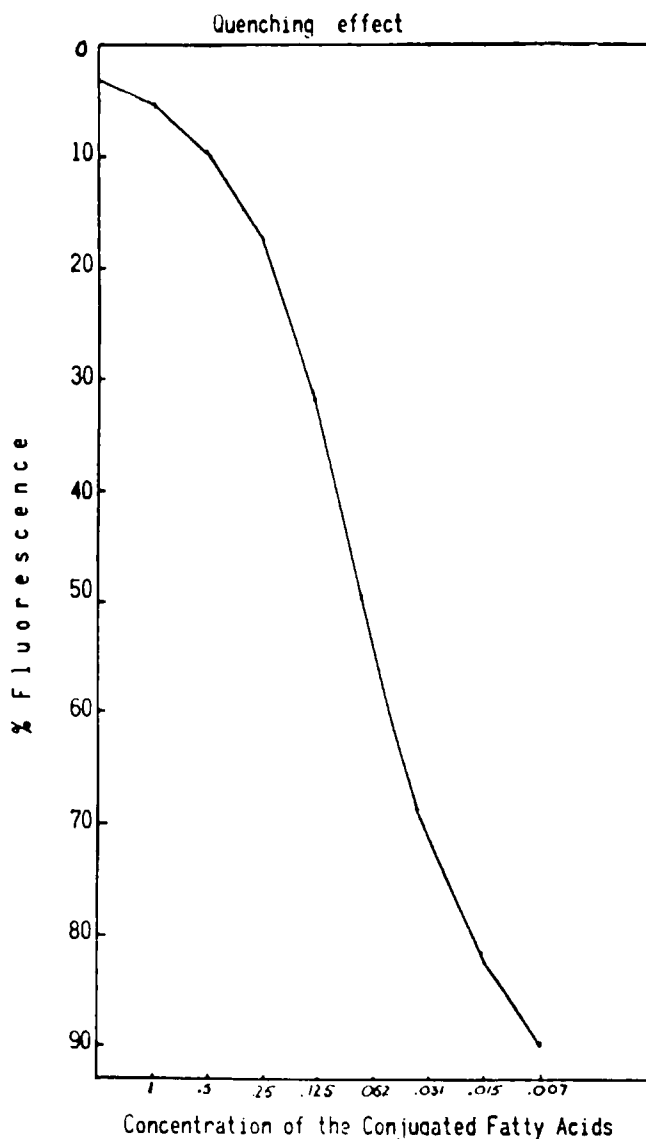


FIG. 282. Quenching of fluorescence of a methylcholanthrene (.0062%) solution in alcohol by different concentrations of conjugated fish oil fatty acids.

chlorine or sulfur. Changes in the proportions of the di-, tri-, tetra-, penta- and hexaenes were followed by means of spectral analyses. The changes in the height of the peaks in these curves corresponding to the different conjugated polyenes were then compared with the changes in the quenching effect of the corresponding fatty acid mixtures. Figure 283 shows the spec-

tral analysis of samples obtained at various intervals during the action of oxygen upon a mixture of conjugated fatty acids. As seen, oxygen induces unequal changes in the height of the peaks in the curves of which correspond to di-, tri-, tetra-, penta- and hexaenes. Fig. 284 shows the quenching activity of the mixtures. It can be seen that a parallelism exists between the relative proportions of the tetraenic component and the quenching activity of

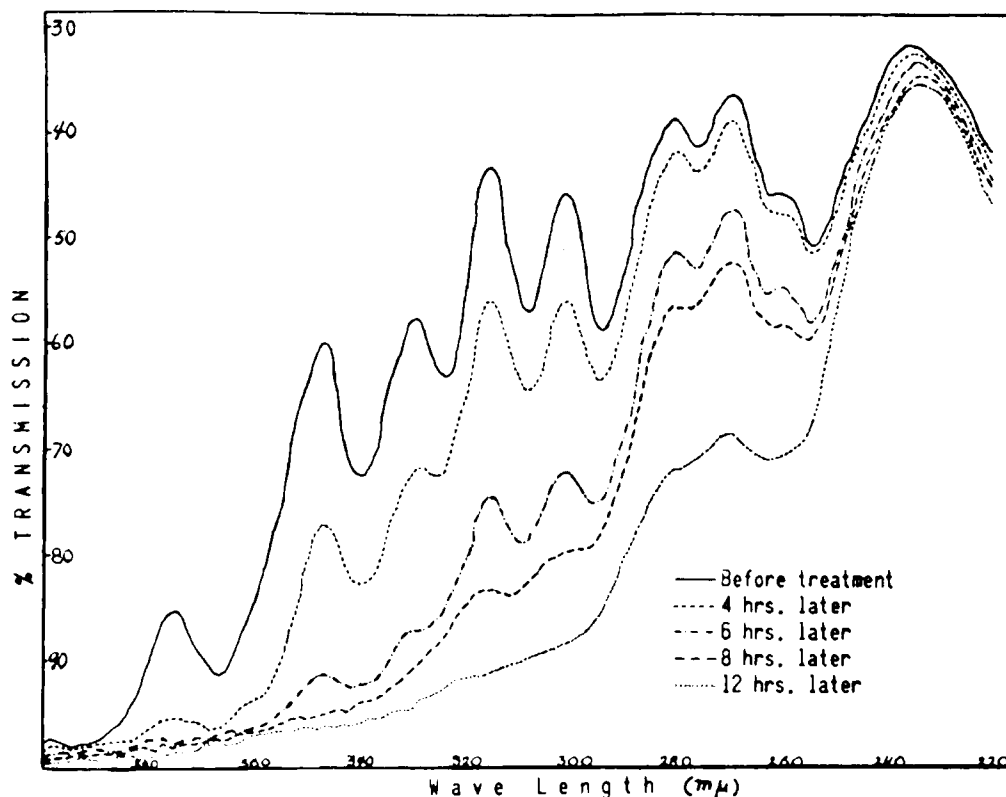


FIG. 283. Changes in the absorption spectra of a mixture of conjugated fish oil fatty acids induced by treatment with oxygen. The treatment has a greater effect on the higher unsaturated members, with the proportion of tri-, tetra-, penta-, and hexaenes decreasing as treatment continues, as seen by the reduction in the height or even disappearance of the peaks. After 12 hours of treatment, the conjugated dienes are the only ones not yet influenced.

Dilution 0.002% in ethyl alcohol.

the mixtures. In this experiment it appears that the quenching effect could also be related to the presence of conjugated pentaenes. Evidence available from other experiments do not, however, sufficiently support this.

We studied in a similar way the effect induced by the treatment—with sulfuric acid—of a mixture of conjugated fatty acids of cod liver oil. Fig. 285 shows part of the occurring changes and Fig. 286, the quenching effect.

Similarly, we studied the changes in the quenching effect during the conjugation with KOH of cod liver oil fatty acids in ethyl alcohol. Fig. 287

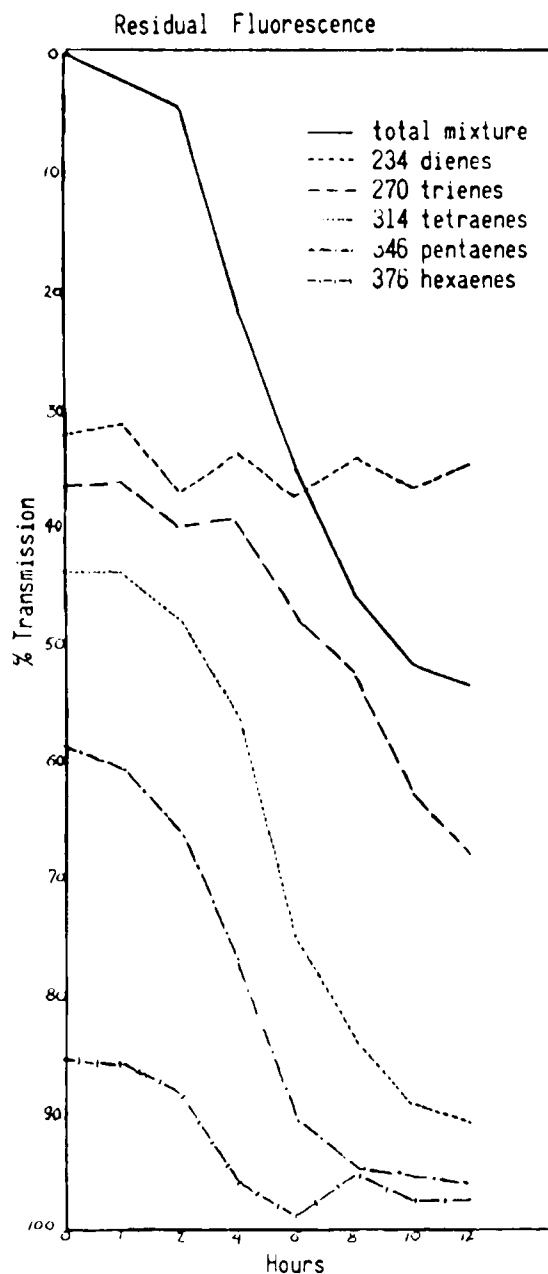


FIG. 284. The relationship between changes of the di-, tri-, tetra-, penta- and hexaenic peaks as found on spectral analysis of samples of conjugated fish oil fatty acids treated for different lengths of time with oxygen and the quenching effect of the same samples. A close parallelism exists between the decrease in the proportion of tetra- and pentaenic peaks and the quenching activity of the mixture.

shows the conjugation effect and 288, the quenching effect of the preparation at different moments, in various dilutions.

The entire problem was simplified by studying a pure conjugated tetraene. We have obtained pure tetraenic parinaric acid from akariton fat

of *Parinarium laurinum* seeds. In addition, we have prepared almost pure tetraenes utilizing the technique described by Maury, Brode and Brown. Unfortunately, with the last method, the results were less favorable, the proportion of tetraenes beginning to decrease long before the conjugated dienes and trienes have disappeared. Pure tetraenic conjugated acid has shown that the quenching action is related almost entirely to the tetraenic component alone, and in a mixture it is largely parallel to the content in conjugated tetraenic fatty acids. Fig. 289 shows the quenching curve induced by parinaric acid.

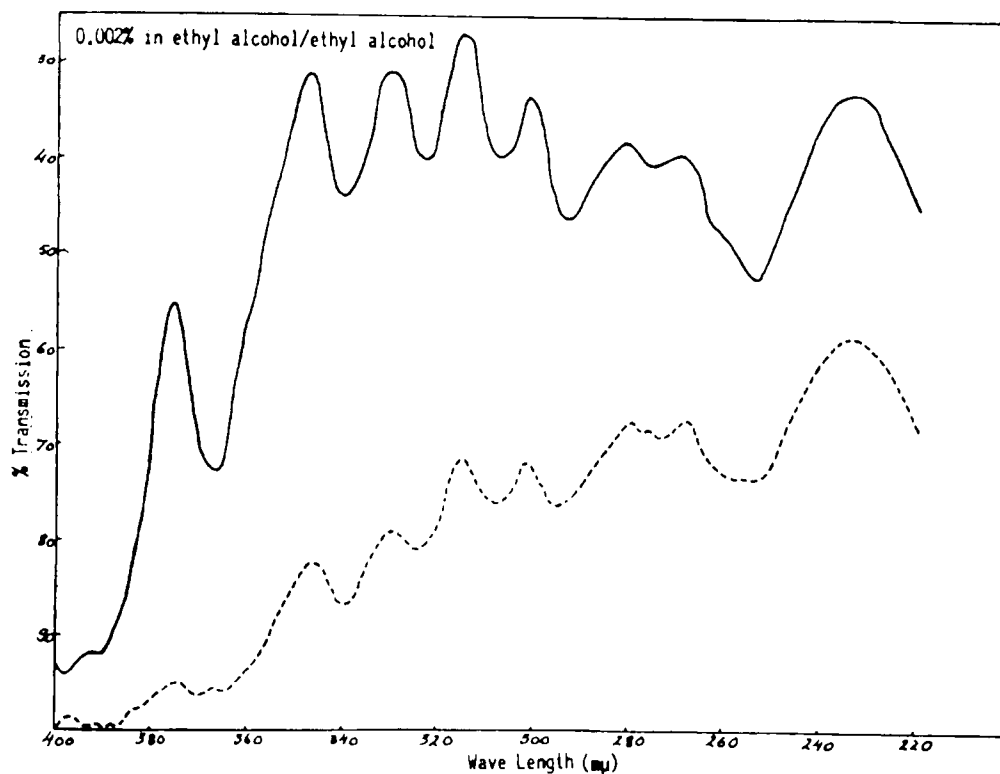


FIG. 285. The changes in the spectral analysis of a mixture of conjugated cod liver oil fatty acids, induced by the treatment with sulfuric acid. The treatment leads to unequal decrease in the amount of different conjugated members. Only two curves are shown: at the beginning of the treatment and at 260 minutes.

#### *Conjugated Fatty Acids and Induced Carcinogenesis*

We have investigated the influence exerted by the fatty acids—conjugated or not, and their mixture, upon the induction of tumors by carcinogens. From the various experiments, some were eliminated, either because the dose of methylcholanthrene employed did not produce tumors in a sufficient number in control animals to permit any conclusive comparison, or the death rate from intercurrent causes was abnormally high so that the entire experiments had to be discarded.

The experiments that were satisfactorily completed are summarized



in the following three tables. In the first group of experiments (TABLE XXXVIII), 4 groups each composed of 40 adult Swiss mice (20 male and 20 females in each group) were employed. Each animal received in the right flank a single subcutaneous injection 0.2 mg. of methylcholan-

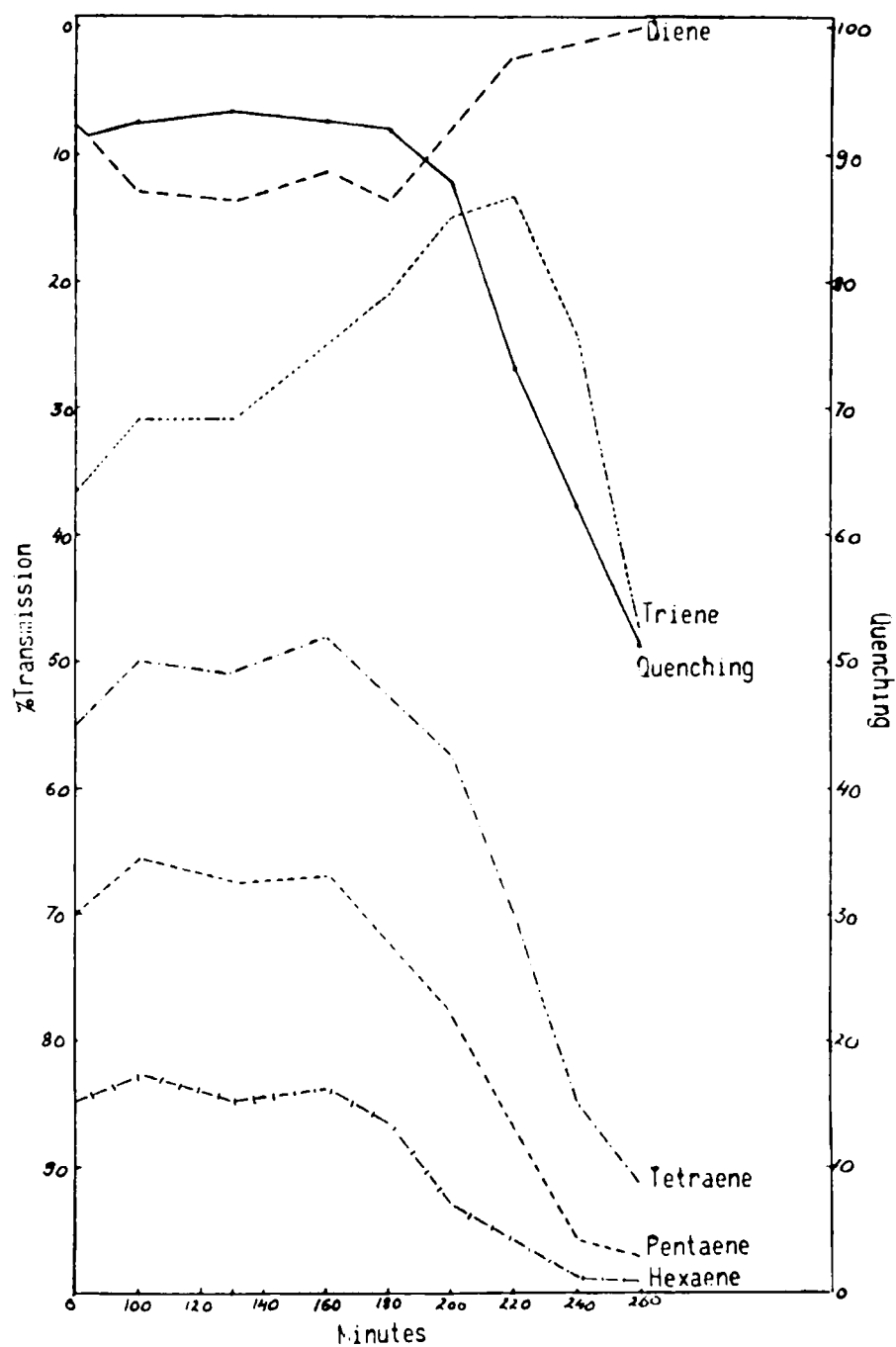


FIG. 286. The changes in the quenching of the treated mixture parallel the changes induced in the amounts of conjugated tetra-, penta- and hexaenes.

threne as a 0.2% solution in tricaprylin. These animals also received subcutaneous injections of a mixture of fatty acids extracted from cod liver oil, or a mixture of cod liver oil fatty acids conjugated by treating them with KOH. The fatty acids were administered as a 5% solution in cotton-

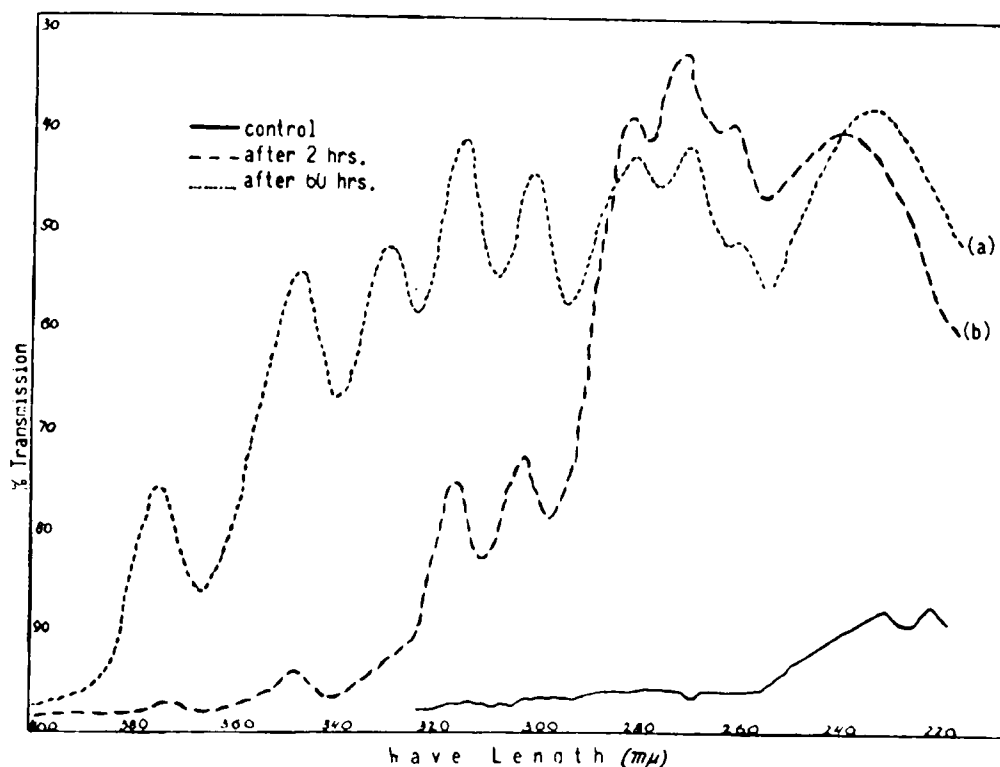


FIG. 287. Spectral analyses of fatty acids of cod liver oil, treated with KOH in ethyl alcohol. They show the appearance of high amounts of tetra-, penta- and hexaenes.

seed oil. Animals treated with fatty acids received 0.3 cc. of this solution in the contralateral side twice a week for three months. The control animals received the same volume of cottonseed oil in the same number of injections. In addition, one group of animals treated with the conjugated fatty acids received four injections during the two weeks preceding the

TABLE XXXVIII

Treatment	Died		% With Tumors
	Without Tumors	Tumors	
Cottonseed oil-controls	10	12/30	40
Fatty acids from cod liver oil	3	18/37	48
Conjugated fatty acids from cod liver oil	6	7/34	20
Conjugated fatty acids from cod liver oil (*)	14	3/26	11

\* Received 4 injections of fatty acids before methylcholanthrene was administered.

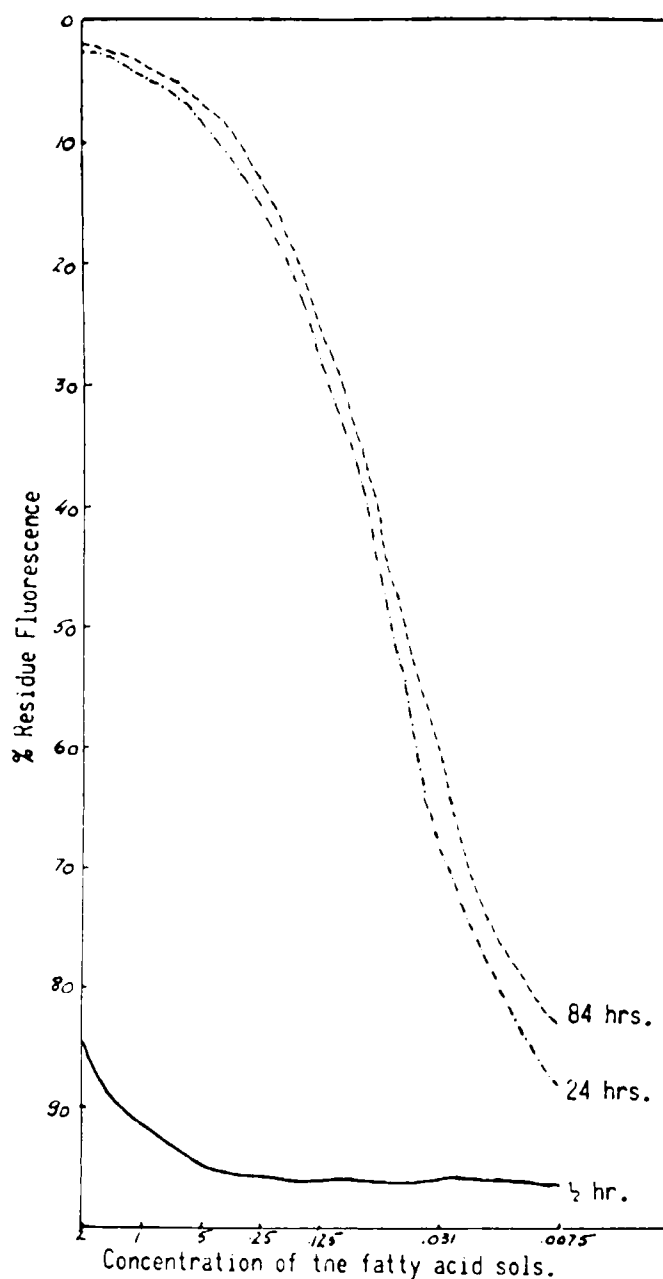


FIG. 288. Changes in the total quenching capacity of samples of cod liver oil during isomerization with KOH in ethyl alcohol. While the quenching effect is reduced—even for high concentration—for the sample having only  $\frac{1}{2}$  hour of conjugation, it is high for that obtained after 24 hours. It remains almost the same for the sample after 84 hours of conjugation. The quenching appears related to the presence of conjugated isomers, with 4 or more double bonds.

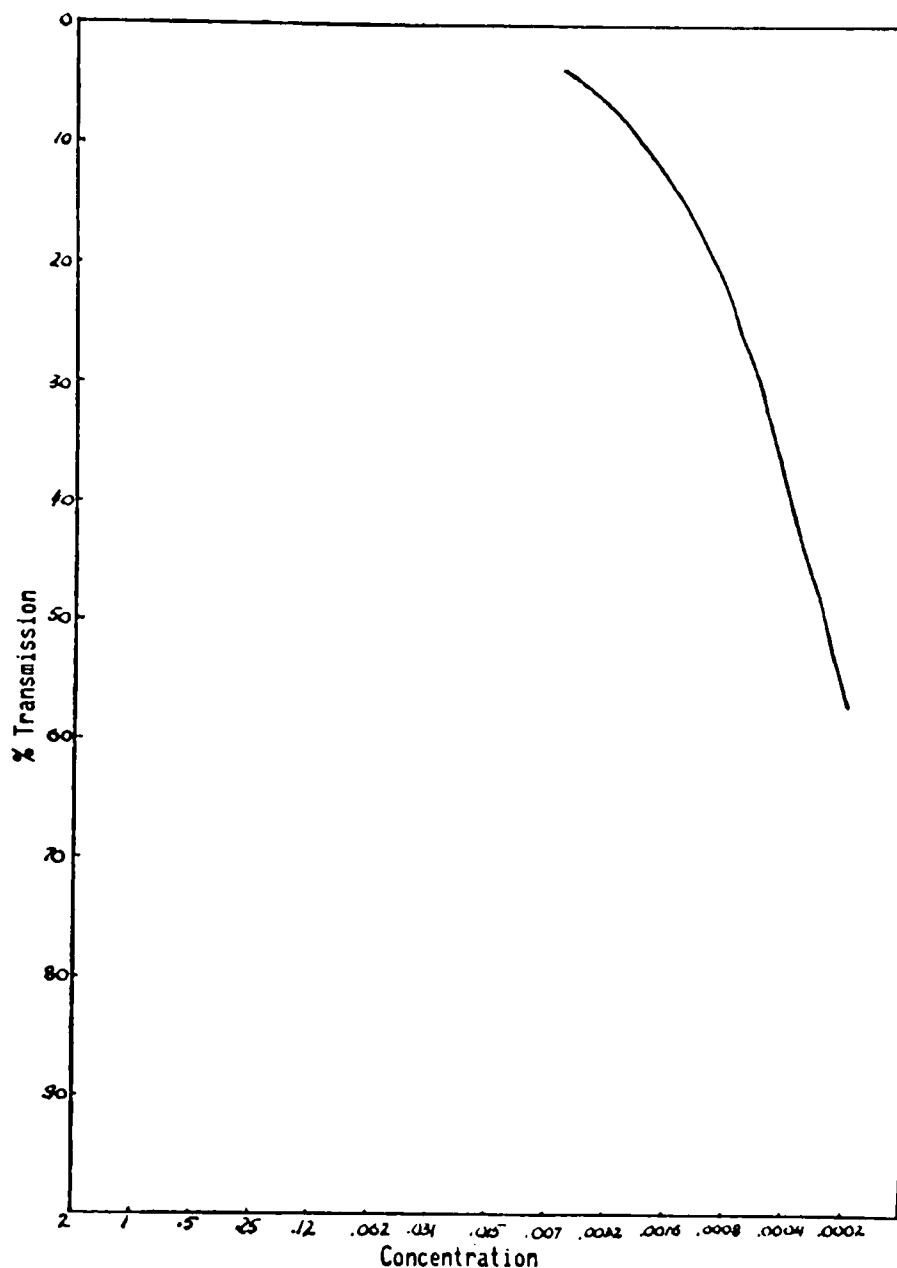


FIG. 289. Quenching effect of parinaric acid upon the fluorescence of methylcholanthrene. The relationship between the quenching effect and the presence of conjugated tetraenes is seen in the fact that parinaric acid has a quenching effect of 96.2 for a dilution of 0.006% and still one of 62% for a dilution of 0.0002%.



methylcholanthrene injection. Thirty-three animals died without tumors during the course of the experimental period. The number of animals surviving for five months plus the number in which tumors developed during this period of time are listed for each group.

In a second group of experiments (TABLE XXXIX) six groups of 40 mice each received one subcutaneous injection of 0.25 mgm. of methylcholanthrene of an 0.2% solution in tricapylin and a second similar injection one week later. Groups were treated twice weekly for three months with 0.3 cc. of 5% solutions of the following fatty acids in cottonseed oil: Fatty acids from cod liver oil, conjugated fatty acids from cod liver oil, eleostearic acid, linoleic acid and conjugated linoleic acid. A control group of animals received 0.3 cc. of cottonseed oil in the contralateral flank twice weekly for three months.

TABLE XXXIX

Treatment	Died	Tumors	%
	Without Tumors		With Tumors
Cottonseed oil—controls	4	31/36	86
Fatty acids from cod liver oil	3	33/37	89
Conjugated fatty acids from cod liver oil	6	15/34	44
Eleostearic acid	10	24/30	80
Linoleic acid	0	29/40	72
Conjugated linoleic acid	6	25/34	73

In the third group of experiments (TABLE XL), four groups of 30 mice each were employed. Mixtures of the methylcholanthrene and of the fatty acids used were prepared by adding 0.5 cc. of the 5% fatty acids in cottonseed oil solutions to 0.25 mg. of methylcholanthrene of 0.25% solution in tricapylin. The injections were made subcutaneously immediately after mixing. Each animal received three injections at intervals of one week and

TABLE XL

Treatment	% Residual Fluorescence	Died Without Tumors	Tumors	% With Tumors
Methylcholanthrene + cottonseed oil	95	6	33/44	86
Methylcholanthrene + fatty acids from fish oil	85	4	20/46	43
Methylcholanthrene + conjugated fatty acids from fish liver oil	19	4	6/46	13
Methylcholanthrene + eleostearic and conjugated linoleic acid	92	11	24/39	61

the observations on tumor incidence were followed for 5 months. The fatty acids employed were fatty acids from fish oil, conjugated fatty acids from fish oil, a mixture of equal parts of eleostearic and conjugated linoleic acids, and cottonseed oil as a control. The quenching effect is shown as the percent of residual fluorescence of methylcholanthrene when mixed with the fatty acid mixtures.

These results indicate a certain relationship between the quenching action of the conjugated fatty acids upon hydrocarbon carcinogens and the ability of fatty acids to reduce the carcinogenicity of these hydrocarbons. It is not sufficient to have a conjugated fatty acid present, in order to have the effect upon carcinogenesis. Eleostearic acid did not significantly reduce the incidence of tumors and conjugated linoleic acid was no more active than its nonconjugated isomer.

Conjugated fish oil fatty acids (which contain di-, tri-, tetra-, penta- and hexanes) when mixed with methylcholanthrene reduced the tumor incidence to 13%, while a mixture of eleostearic and conjugated linoleic acid (di-, and triene conjugated acids) which have a limited quenching action gave an incidence of 61%. Although the incidence of tumors was much lower in the group receiving conjugated fish oil fatty acids, the non-conjugated fatty acids from the same source has a limited influence upon the cancer inducing property of the hydrocarbon. When fatty acids were not mixed with the carcinogen, but were injected separately, the nonconjugated acids appeared without effect.

Statistical analysis of the data from these three experiments show the following: the results are significant for the group treated with conjugated fatty acids from cod liver oil before and after methylcholanthrene was administered as compared with control group treated with cottonseed oil in Experiment I ( $\chi^2 = 6.65$  on basis of tumor/no tumor). In Experiment II,

TABLE XLI

QUENCHING OF METHYLCHOLANTHRENE 0.062% IN ETHYL ALCOHOL  
BY SUBSTANCES OTHER THAN FATTY ACIDS

Substance	% Dilution Used	Fluorescence
Glycerol	5.0	106.8
n-Butanol	4.5	96.4
Butyl mercaptan	1.0	102.5
Hexyl mercaptan	2.0	92.0
Dodecyl mercaptan	2.0	82.0
Hexadecyl mercaptan	2.0	70.0
Na thiosulfate	.05 cc. from 50% solution	97.0
Ethyl sulfate	1.0	95.0
Nitrogen mustard	0.1	79.9
Allyl K xanthate	1.0	3.8
Nitromethane	1.0	7.4
Ethylene trithiocarbamate	1.0	.2
Cholesterol	1.0	93.0

the results are very significant for the group treated with conjugated fatty acids of cod liver oil as compared with the control group ( $\chi^2 = 13.09$ ). In Experiment III, the results are very significant for all three groups in which fatty acids were added to the methylcholanthrene ( $\chi^2 = 13.3, 41.56$  and  $8.32$  respectively).

When comparison is made on the basis of tumors/no tumors between groups receiving nonconjugated and conjugated isomers of the same fatty acid mixtures, the results were significant in all three experiments ( $\chi^2 = 8$  in Experiment I, 22 in Experiment II, and 12 in Experiment III).

In the light of the relationship between quenching activity and the reduction of the carcinogenic activity, we are investigating different other agents. Table XLI shows the values of this effect.

## Chapter 12, Note 5. Lipids and Tumor Chlorides

We submitted groups of mice grafted with DBA mammary adenocarcinoma, to treatment with various lipoacids or positive lipoids preparations. After ten days of treatment the tumors were removed and analyzed for their content of chlorides, using the Volhard technic, in which the titration of silver nitrate was made electrometrically. As lipoacids, we used for experiment cod liver oil fatty acids, lipoacids from human placenta and butyl-mercaptan; for lipids with a positive character, we used cholesterol, insaponifiable fractions of human placenta and butanol. In all cases treated with lipoacids, the amount of chlorides was higher than in untreated controls. With cod liver oil fatty acids, values as high as 135% above those of controls were found. With the lipoacids of human placenta, the average value was 114% above that of controls; with mercaptans, 78% above. The influence exerted by the opposite lipids was much less manifest. With cholesterol and insaponifiable fractions, chloride values were 20% below those of controls; with butanol, 33% below.

Chapter 12, Note 6.  $\alpha$ -OH Fatty Acid and Experimental Tumors

We studied the influence exerted by the series of alpha OH fatty acids, saturated and unsaturated, upon the evolution of different tumors in mice and rats, to find that only one member has a manifest effect which is limited to a single tumor. Subcutaneous grafts of 6C<sub>3</sub>HED lymphosarcoma in C<sub>3</sub>H mice grew with abnormal rapidity. 48 hours after the transplant, the tumor could be felt. A very soft, highly edematous and, for this reason, diffuse tumor developed rapidly so that death occurred usually around the tenth day. This tumor was especially resistant to most of the chemotherapeutic agents tested. Daily administration of a 5% solution of alpha OH caprylic acid in a dose of 0.2-0.5 cc., started even the fifth day after the graft when the tumor was already well-developed, was followed by its rapid involution and disappearance in a high proportion of cases (55/60). In the few cases in which the tumor persisted, its evolution was very much changed. The animals remained alive for more than a month. If, after three

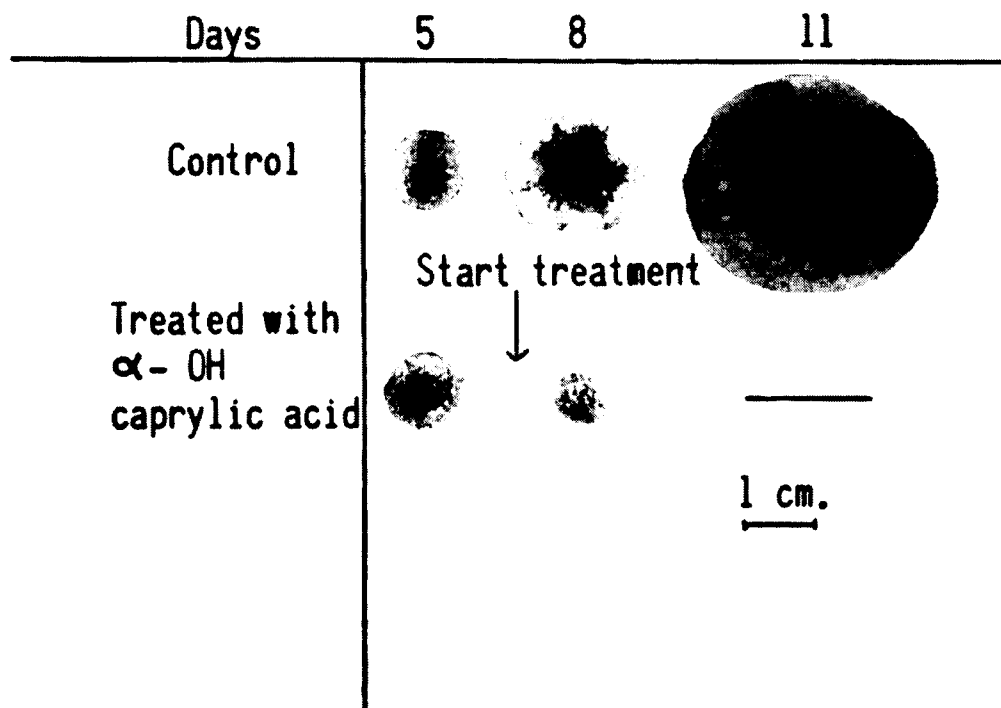


FIG. 290. The administration of alpha OH caprylic acid in mice bearing 6C<sub>3</sub>HED lymphosarcoma tumor, induces the disappearance of the tumor in a high proportion of cases.

or four days, when the tumor was already highly reduced, the administration of the preparation was discontinued, the tumor began to grow again, but much more slowly than usual.

#### Chapter 12, Note 7. Hydropersulfides

The existence of different bonds between unsaturated fatty acids and oxygen led us to study different bonds similarly occurring between the same fatty acids and sulfur, the second member of the oxygen series. The treatment of polyunsaturated fatty acids or their triglycerides with sulfur has shown that two different formations can be obtained. By heating the mixtures above 110° but below 125° C, precipitated sulfur is incorporated without a manifest change in color or other properties. The iodine number is not changed. When conjugated fatty acids or their triglycerides are treated, no changes are seen in the spectral analysis. By heating above 130° C, the color of the preparation changed progressively reaching deep red-brown if the treatment is sufficiently prolonged. Concomitantly, the iodine number decreases progressively and eventually reaches zero. The spectral analysis of the conjugated fatty acids shows the peaks going progressively down until no more conjugated formations are present, indicating that these changes affect the double bond.

The analogy between the fixation effects of oxygen and sulfur has sug-

gested that the first bond corresponds to a hydropersulfide similar to a hydroperoxide. The second bond would represent a fixation of the sulfur at the level of the double bond itself, similar to a peroxide. Studies of similar bonds of sulfur were made in tetralin where hydropersulfides were obtained. The study of the properties of all these preparations seems to confirm the hypothesis that the compounds obtained are hydropersulfides.

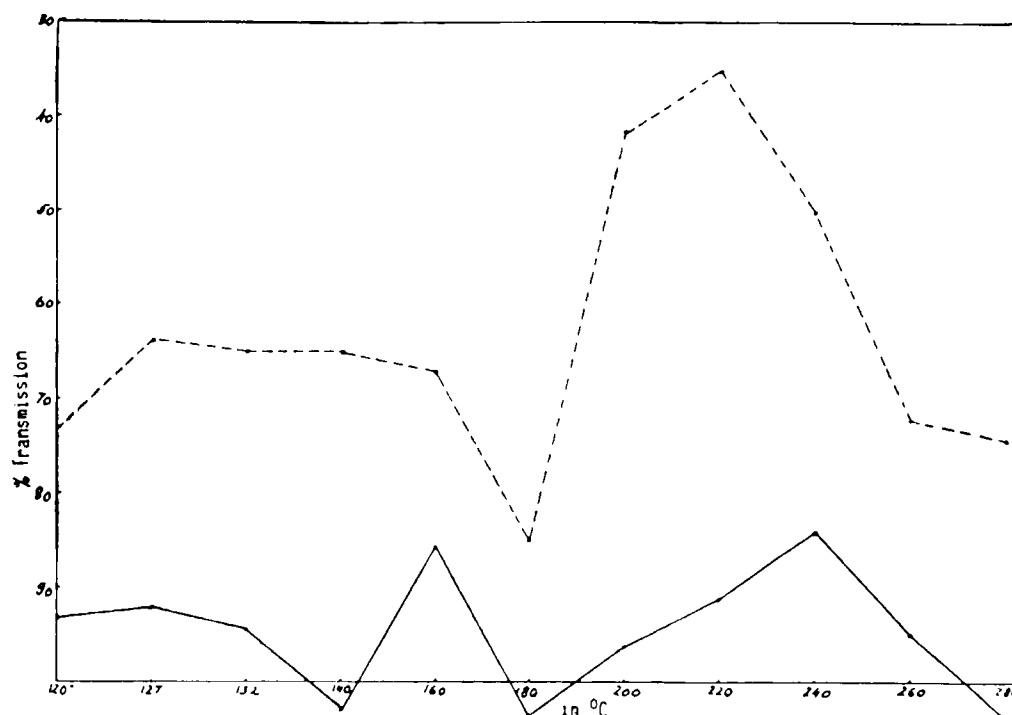


FIG. 291. Quenching of methylcholanthrene fluorescence in samples obtained when 0.5% sulfur in cottonseed oil was heated from 120°C to 280°C. The samples were dissolved in ether-alcohol mixture and mixed in equal part with .0125% methylcholanthrene. The existence of concomitant changes in the oil with sulfur and in the oil alone, indicates that the variations correspond primarily to changes which take place in the oil itself when heated.

We studied the changes in the quenching effect upon the fluorescence of methylcholanthrene which occur when sulfur added to a mixture of triglycerides is heated. This was compared with the effect of heating upon cottonseed oil alone. Fig. 291 shows the results of this analysis.

## Chapter 12, Note 9. Magnesium and Adrenalectomy

The biological antagonism between homotropic magnesium and heterotropic sodium, both acting at the metazoic level, has led us to the study of the specific influence exerted by magnesium upon the recovery processes in adrenalectomized rats. It is known that, while an adrenalectomy is not always fatal in old rats—death occurs uniformly in younger animals weigh-

ing less than 150 grams. The administration of 1% sodium chloride as drinking water is known to protect the adrenalectomized animal and, if administered for a sufficient length of time, to prevent death. The administration of magnesium sulfate by repeated injections of .5 cc. of a 10% solution per 100 grams of body weight or even orally as .5—1% in drinking water has an antagonistic effect to that of sodium chloride. A 75% mortality rate in older animals receiving magnesium sulfate as compared to a 20% rate in the untreated was seen. Similarly, in young animals receiving magnesium sulfate in addition to salty drinking water, the mortality rate in some experiments was over 80%.

### Chapter 13, Note 1. Glycerol and Chills

In one of a group of severely burned subjects, who were at that time under our care and had been experiencing several chills a day, an injection of glycerol solution had been given by coincidence just at the moment when a chill was starting. While such a chill always previously had lasted for more than ten minutes in this patient, it stopped almost immediately after the glycerol injection.

An experiment was set up to confirm or negate this correlation. As soon as any patient of this group felt the sensation or premonition of a chill, he was given either an intramuscular injection of 3-5 cc. of a 20% solution of glycerol in saline or 3 cc. of saline alone as placebo. In almost every case, the chill was cut short by the glycerol while the placebo had no effect. Less striking but still interesting effects were obtained when 20 to 30 drops of glycerol were given orally in 50 cc. of water against an oral solution of 1% sugar in water as a placebo.

Not one of the other substances used at this time, such as adrenalin, quinine, pilocarpine or pantopon, orally or parenterally influenced a chill once it had begun. Later, butanol also was found to have an effect similar to that of glycerol although less manifest.

Since the first experiment with glycerol, we have tried it in many patients subject to repeated chills and have frequently obtained the same results. We have tried to explain glycerol's effect upon chills by considering the role of chills in the defense mechanism. Chill would mark the beginning of the second phase of the diphasic defense phenomenon. (See Chapter 5.) It brings various constituents, especially those which have to replace constituents altered in the first hydrolytic phase. Among them are agents especially able to influence the free fatty acids liberated in the first phase. Apparently, the fact that it takes some time for the anti-fatty acid agents to pass into the circulation, most of them coming from the RES cells, makes the chill last so long. The immediate presence in the blood of a sufficient amount of glycerol, which is a relatively efficient anti-fatty acid agent, eliminates the need for liberation of body anti-fatty acid agents. Thus, with glycerol, the chill would no longer be required to induce liberation of such agents and would stop.



## Chapter 13, Note 2. Influence of Glycerol Upon the Cardiac Rhythm

Figure 292 shows the electrocardiogram of a rabbit receiving a solution of 20% glycerol intravenously. Frequent extrasystoles appeared. It was interesting to note that, at the same time, the animal became somnolent.

## Glycerol

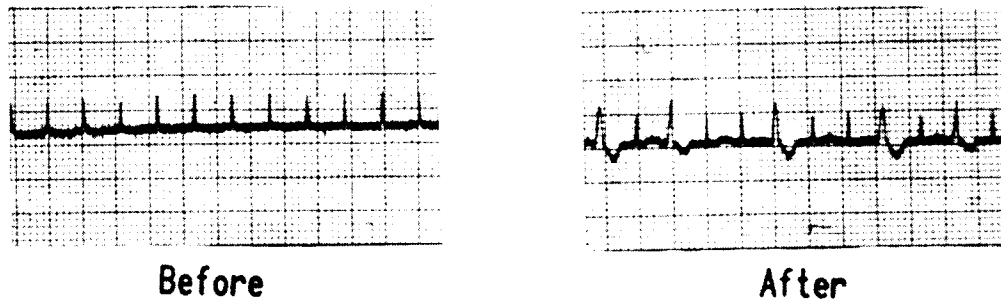


FIG. 292. Electrocardiogram of a rabbit receiving intravenous injections of a solution of glycerol 20%, characterized by the appearance of extrasystoles. (a) before treatment. (b) after 30 cc.

## Butanol

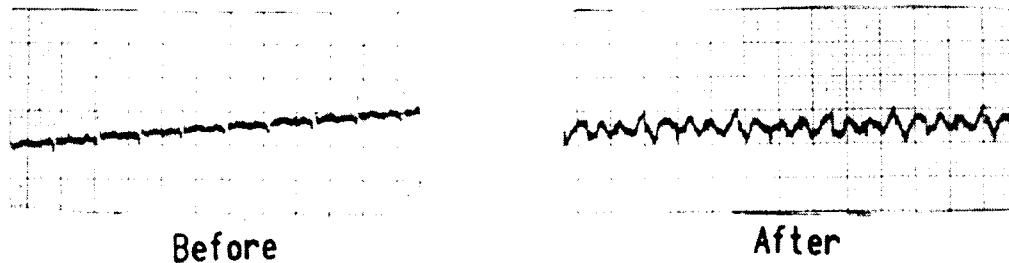


FIG. 293. Extrasystoles appear after the intraperitoneal injection of butanol in very high doses. (a) before treatment. (b) after 1.6 gram/1000 gr of animal.

## Chapter 13, Note 3. Glycerol Induced Convulsions

Repeated injections of glycerol in rats were seen to induce convulsions. Using rats weighing 200-250 grams, 5 to 10 cc. of the 20% solution of glycerol in saline were injected intraperitoneally. The injections were repeated once or twice a day. After several days of treatment, usually from 3 to 5 days, one of the injections was followed within a few minutes by a severe convulsion, lethal for most of the animals. In the surviving animals, the next injection was always followed by a lethal seizure.

## Chapter 13, Note 4. Suspensions of Lipoids

In order to obtain colloidal suspensions, various lipoids were dissolved in alcohol and a certain amount of the alcohol solution mixed with water, saline or isotonic solutions. From the resulting milky suspensions, the al-

cohol was eliminated by boiling under reduced pressure. To insure almost complete elimination of the solvent, an excess of water was added and the excess was then eliminated through boiling. The use of acetone or ether as solvent gave much less favorable results.

Relatively stable suspensions were obtained by mixing some lipid preparations such as mixtures of unsaturated fatty acids with a 0.5% solution of cellulose gum. Such stable suspensions could not be obtained with preparations of positive lipids.

#### Chapter 13, Note 5. Cholesterol Induced Convulsions

When relatively larger doses, such as 5 cc. of 2% cholesterol daily, were administered repeatedly to rats of around 250 gr. of weight, convulsions appeared after 4 to 8 days. They were induced earlier in females than males. The first convulsion always was lethal. Convulsions also occurred in humans after repeated injections of cholesterol in doses as high as 20 cc. of the 2% solution in oil. Even small doses, such as 2 or 3 cc. of the same solution, induced convulsions in patients with brain metastases or in those who had had previous convulsions.

#### Chapter 13, Note 6. Treatments In Successive Generations

The relatively short survival time of animals bearing transplanted tumors has been a handicap for the study of the influence exerted by many agents. Effects requiring some time before they can be induced are thus missed. Changes which occur in tumors—such as the tendency to ulcerate after treatment with fatty acids—have been found to be transmitted in successive generations of the tumors. This has led us to carry on treatment beyond the survival time of one individual host in order to study the influence of various agents. In one group of experiments, this was done through treatment of the successive hosts of serial transplants. In another group of experiments, the treatment was applied to the transplants themselves in successive hosts.

Mice with grafted tumors were treated with the chosen agents. When the tumor in a treated host, or in a control, had grown to 1½ centimeter diameter, it was removed. Part of it was used for further transplants, part for microscopic studies. The rest of the animals were kept until death and the survival time was noted. Transplants of the tumor from treated animals as well as from controls were grafted in new animals and the treatment continued for the new hosts. This procedure was repeated for successive generations. In other experiments, the successive transplants were dipped, prior to grafting, in an oily solution or in a suspension in saline of the agent being tested. The procedure was repeated continuously for both treated animals and controls, and growth and survival time were noted. The following experiments are characteristic.

Using the insaponifiable fractions of human placenta in an oily solution





of 5%, or in a saline suspension corresponding to two milligrams of the material per cubic centimeter, the following results were observed in the case of Ehrlich mammary carcinoma in mice. No changes in survival time, evolution of the tumor, gross or microscopic character were seen in the first and in some experiments even in the second generation. Usually with the third generation, the survival time was reduced, the tumor growing much more rapidly and killing the animal in around 20 days. The malignant character of the tumor was seen to increase in the subsequent transplants and in the fifth generation in some experiments, killed the animal in

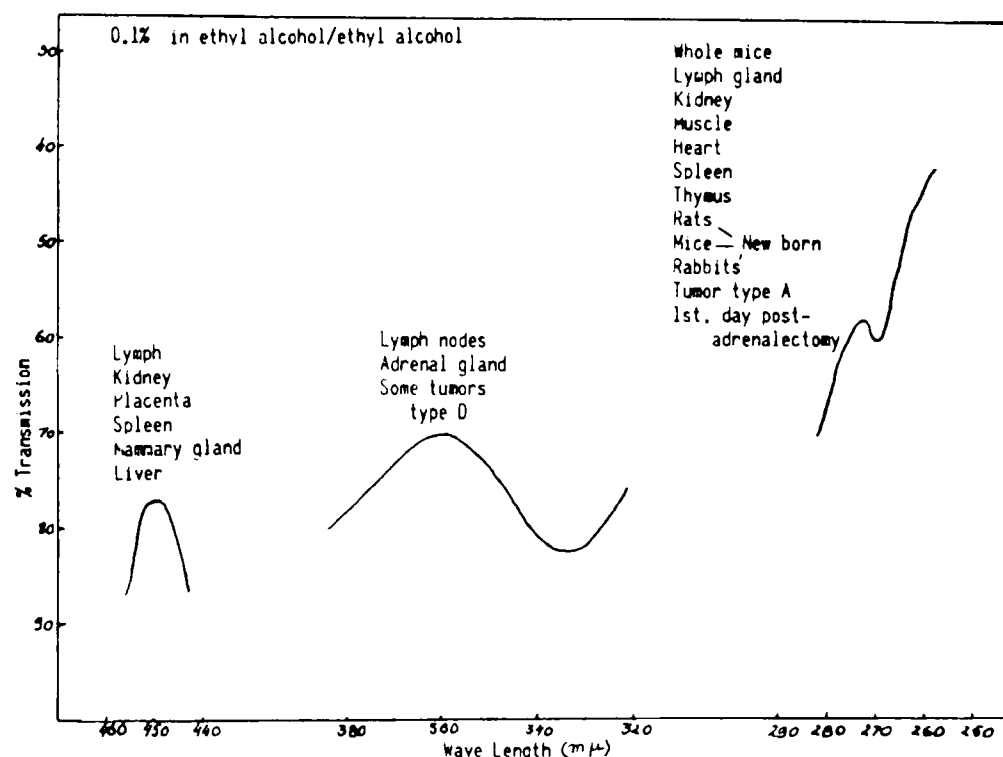


FIG. 294. Spectral analysis of the insaponifiable fraction of various origins. It shows a characteristic peak at 450 mμ, another at 360 and another at 272. The organs in which they are especially present are indicated.

less than a week. The morphological change observed in these successive transplants were also characteristic. The tumor was seen to change from solid to encephaloid. The adenocarcinomatous character was thus altered and the degree of undifferentiation was increased by passing through the third, fourth and sixth generation. At the sixth generation in some experiments—and the fifth or eighth in others—microscopic examination showed that sarcomatoid portions were present in the tumor. The malignancy appeared to be at its maximum in these tumors. Transplants of tumors with sarcomatoid microscopic character, if treated in the same manner, gave negative grafts. Thus, it appears that the treatment with the insaponifiable

fractions has progressively increased the malignancy until the moment when sarcomatous character appeared after which negative transplants were observed.

The treatment of a tumor with lipoacid preparations of human placenta has produced opposite changes manifest even in the first transplants. These

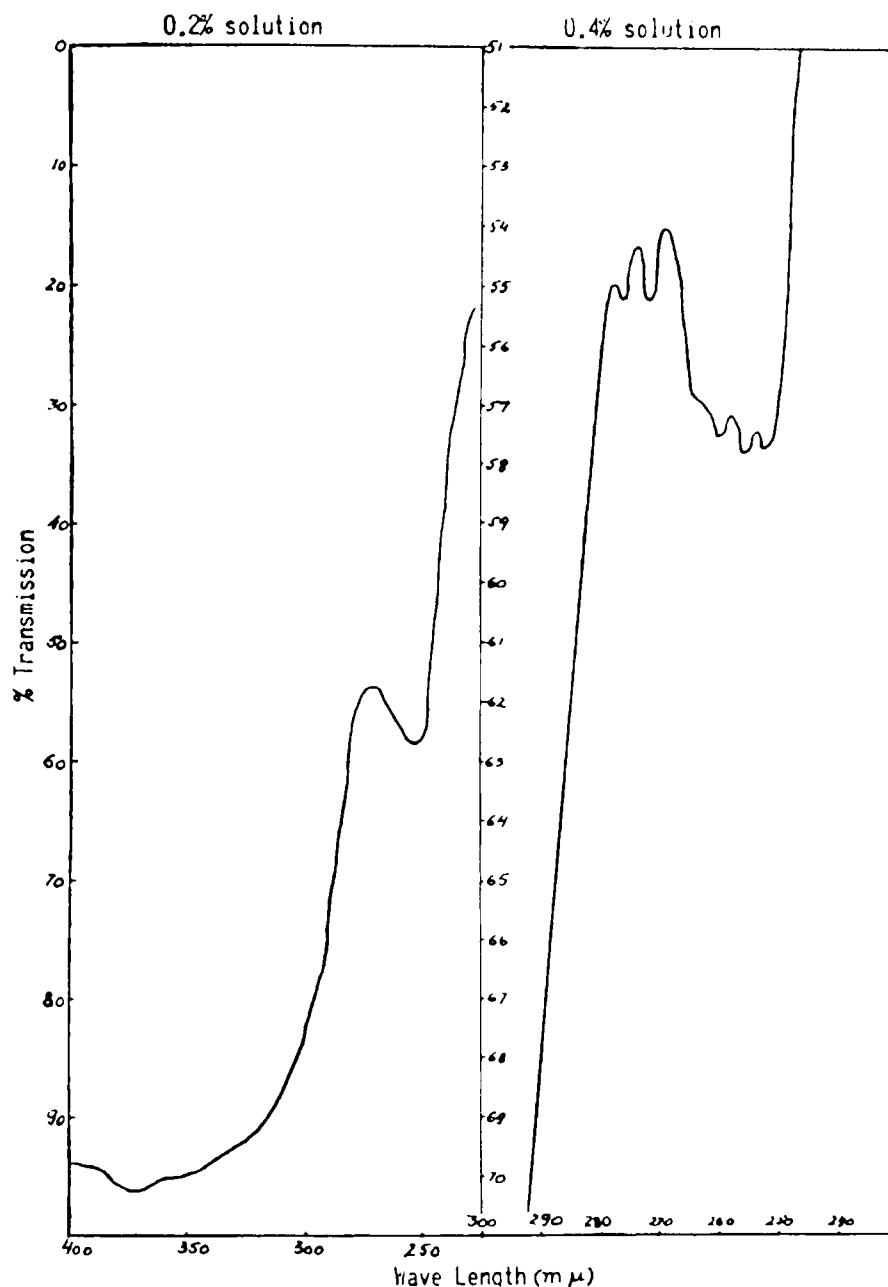


FIG. 295. Details of the spectral analysis of rat colostrum indicates the existence of a formation with three peaks in the region 290-250 mμ with some similarity to the conjugated trienes.

increased in the second generation. After the second and very rarely after the third grafts, negative transplants were obtained. We used this method of treating tumors through successive generations routinely. The results obtained for different agents are discussed in the text of this publication.

#### Chapter 13, Note 7. Conjugated Trienic Alcohols

Spectral analysis has permitted us to recognize the presence, in certain mixtures of the insaponifiable fraction, of several peaks, some especially interesting. Characteristic peaks were seen at 450, 360 and 272  $m\mu$ , as shown in Figure 294. In the first analysis, one was identified as corresponding to a peak of 2720 Angstroms. In more complete further spectral analyses, it could be seen to correspond to a conjugated triene with its characteristic three peaks. The fact that it corresponds to a substance with positive polar group explains why, compared with conjugated acids, the curve shows a marked displacement of the peaks toward higher wave lengths. (Fig. 295) This can be related to the different influence exerted by the electrically opposite polar groups. This compound was first found in the colostrum obtained from the stomach of newborn rats on the first day. In smaller amounts, it has been seen in other samples of milk or butter, and in pork kidneys. It has been found less frequently in growing tumors and is even rarer in growing animals.

The same spectral analysis has permitted us to recognize other peaks and relate them to the different sources from which the unsaponifiable fraction was obtained. Fig. 294 shows these peaks and indicates their correlation with the origin of the material.

#### Chapter 13, Note 8. Toxicity of Butanol in Humans

A group of advanced schizophrenic patients (221) were given 500 cc. of a 6% solution of n-butanol in saline intravenously, the entire amount being injected in 30 minutes. The only manifestation which could be considered to parallel the toxic effect in animals was a very short period of somnolence which, in only one or two cases, could be considered as sleep. Usually, even with doses of 500 cc. of a 6% solution administered intravenously in less than 25 minutes, it was not possible to obtain even this transitory somnolence. No toxic effect was noted when the same dose was again administered 24 to 48 hours later, and repeated several times. Except for an inflammation of the vein which appears only if hundreds of cc. of a solution above 6% is injected, no other noticeable effects are observed.

The intravenous administration, in postoperative cases, even of 15 gm. of butanol diluted in about 2-3 liters of saline per day, repeated for four and even five consecutive days, has been entirely free of any toxic effect.

Intramuscular administration was observed to be well tolerated even for higher concentrations of butanol. We obtained concentrated aqueous solutions by dissolving butanol in a 35% solution of sodium benzoate in water. Preparations containing more than 30% butanol seemed to induce

necrosis when administered intramuscularly in animals and to induce pain at the site of injection in humans. A 30% solution of butanol, however, was well tolerated. Daily administration of subnarcotic doses for long periods to mice caused no toxic effects. On the other hand, repeated injections with narcotizing doses were toxic and even led to death of the animals after several days.

### Chapter 13, Note 9. Butanol and Leucocytes

The administration of butanol in solutions of 6.5% in saline intraperitoneally in rats was seen to induce a hyperleucocytosis. 5 cc. injected at once was seen to double the previous amount of leucocytes. This increase

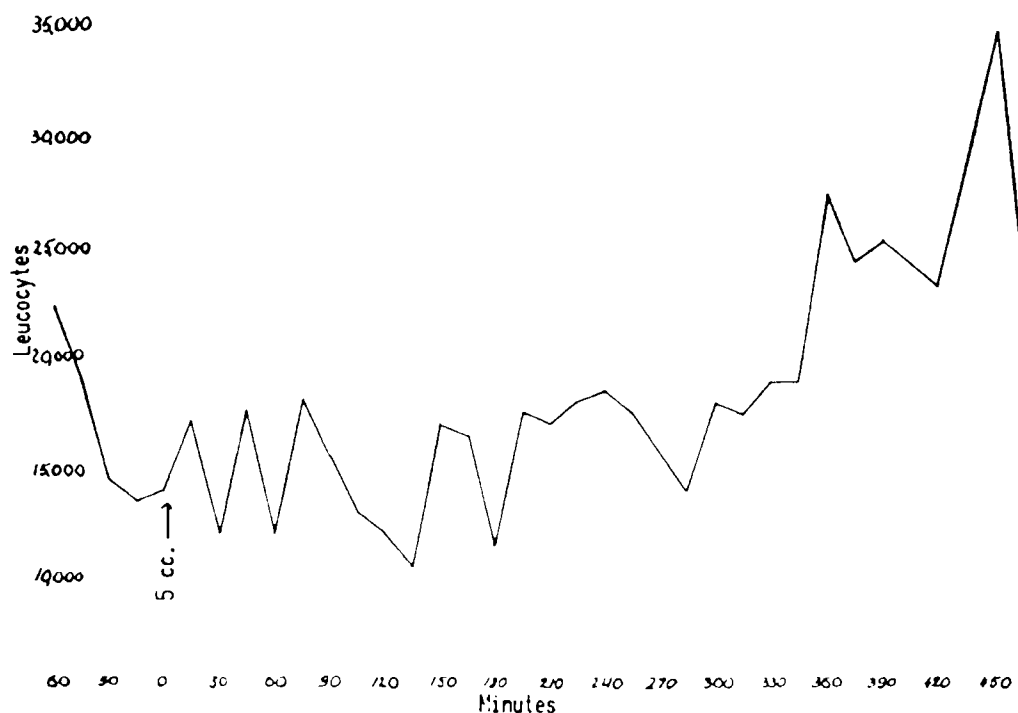


FIG. 296. The administration of 5 cc. of a solution of 6.5% n-Butanol intra-peritoneally to rats induces an increase in the leucocyte number.

started two hours after the beginning of the injections and continued progressively, to reach the value of 34,000, seven hours after the beginning of the injections. The hyperleucocytosis was seen to persist for more than 24 hours. The number of leucocytes was increased in the animal shown in Fig. 296.

A still more manifest effect was obtained with injections of 1 cc. of the same solution, repeated every hour during the day. It is interesting to note that this effect was manifested almost 6 hours after the injection with butanol. Fig. 297 shows an example of these experiments in which the number of leucocytes arrived at 42,500.



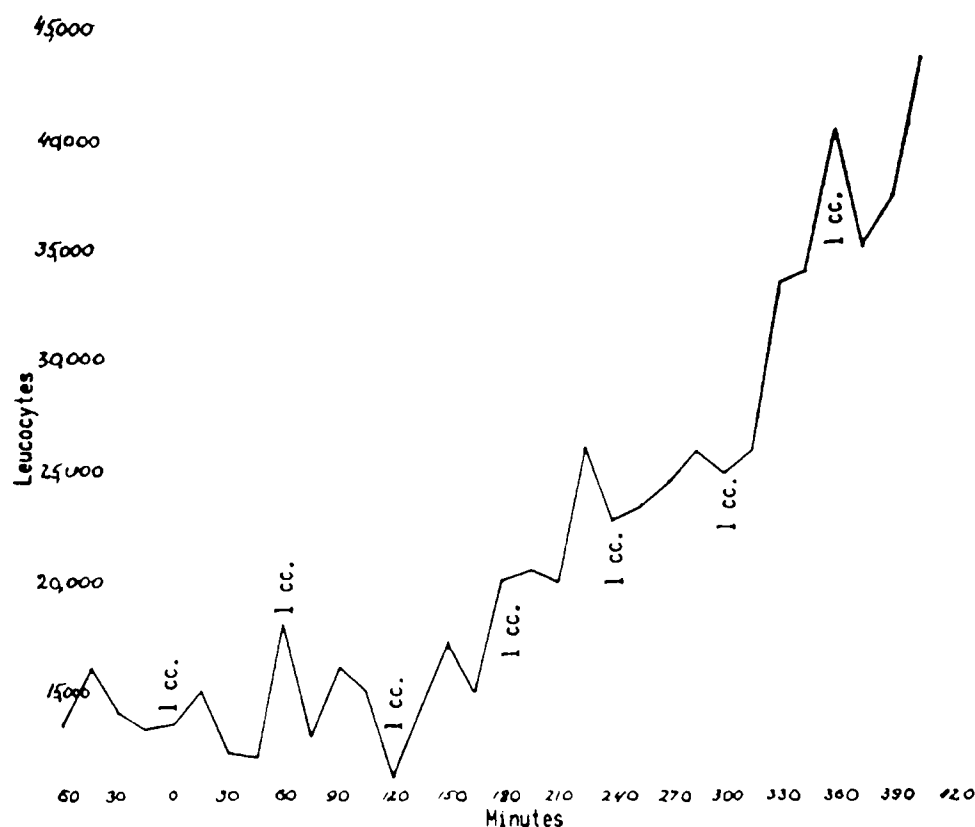


FIG. 297. The administration of 1 cc. of n-Butanol, repeated every hour, induces a sizable increase of leucocytes in rats.

### Chapter 13, Note 10. Butanol-Sodium Lactate in Burns

In collaboration with R. Ravich and P. Teitelbaum we studied the effect of various agents upon the survival time of mice to which a severe caloric burn was inflicted. Under ether anesthesia, adult white female mice were scalded until the xyphoid, in water maintained at 90°C. When the duration of this treatment was 4 or more seconds, the animals died in a few minutes in superacute shock. With 3 seconds the animals survived the immediate effect of the burning.

They started to die several hours later, in 6 hours 40% of these animals had died, and at the 18th hour, 90% were dead.

The influence exerted by various agents was studied by injecting the respective solutions 2-3 times a day according to the experiment. The effect was judged according to the survival time. As the animals did not eat or drink and especially due to the local burns did not urinate or defecate, we considered the effects obtained during the first 18 hours, after which the animals were sacrificed and used for the study of the chemical changes. Fig. 138 shows the results of such an experiment with sodium chloride, isotonic solution—sodium lactate 6 M solution, butanol 6.5% in saline—and butanol 6.5% in the sodium lactate solution. While sodium lactate

alone seemed even to increase the mortality, and butanol in saline alone influence little this mortality, the effect of the butanol—sodium lactate solution was manifest. The mortality was reduced from beginning to end of the experiment. At the 18th hour it was of 30% instead of 90% for the controls. And of 95% for the animals treated with sodium lactate alone.

#### Chapter 13, Note 11. Effect of Heptanol

Adult rats and mice were injected subcutaneously in the back with 20 cc. and 3 cc. respectively of nitrogen which had been sterilized by being passed through sterile cotton plugs. Into the pouches so formed, a suspension of living coli bacilli—2 cc. for rats and  $\frac{1}{4}$  cc. for mice—was injected. This suspension was obtained from a 24-hour culture on agar and was diluted to provide 10 million microbes per cc. One group of animals was treated by intraperitoneal injection of 1 cc. (for rats) and  $\frac{1}{4}$  cc. (for mice) of sterile sesame oil. The other group received injections of similar doses of 2% heptanol in oil. In some experiments, only one injection with heptanol was given, while in others this was repeated daily or every second day. In the controls no special reaction was seen. In the heptanol-injected animals an exudate appeared in the infected pouch and led to rapid necrosis of the skin. A characteristic of the exudate was the presence of a small number of leucocytes.

#### Chapter 14, Note 1. Observations of Dr. E. Stoopen

From a series of observations published by E. Stoopen (184), we chose the following:

"Right trigeminal neuralgia for the past 10 years, with short, sharp pains. Neither food intake, nor time of day have ever influenced the pain. The patient was submitted to various treatments such as ultraviolet rays, quinine, neosalvarsan, cobra poison and vitamin B. First alcohol nerve block calmed the pain for 15 months. Second alcohol injection brought no relief. Third block calmed the pain for one year. Fourth alcohol injection calmed pain for three months. The last injection caused, however, trophic ulcerations of the throat and corneal ulcerations with ultimate loss of the sight.

In June 1942, a treatment with glycerin and the insaponifiable lipid fraction was begun. The pain which proved to be of an alkaline type, ceased in 3 days.

In July 1943, the patient had a lumbago attack, a condition from which she had often suffered and which had been both long-lasting and resistant to classical medication. Treatment with the insaponifiable lipid fraction made the pain subside within a few days.

In an attempt to modify the ulcerations in the throat, though the pain had not reappeared, the patient was continuously treated with the insaponifiable fraction and cholesterol, and with large doses of vitamin A. However, there was no effect on the ulcerations.





days). However, the treatment achieved what had been impossible for all previously tried treatments—the cessation of pain once it had started.

These observations led to the following pertinent conclusions: 1) they showed the existence of typical acid or alkaline pain; 2) the possibility of changing pain from one type to the opposite one, either during the course of the disease or due to medication; and 3) the possibility of eliminating pain with appropriate treatment.”

#### Chapter 14, Note 2. Dr. Welt's Publication on Butanol—Conclusions

“n-Butanol was administered to a large number of patients with pain due to the trauma of various common otorhinolaryngological and ophthalmologic surgical procedures. Pain was relieved in approximately 90 per cent of the patients so treated.

These clinical results were considered in the light of studies by Revici and his co-workers regarding the physiopathology of wounds. The results indicate that the proposed concept of pain has significant practical clinical applications.”

#### Chapter 14, Note 3. Dr. A. Ravich's Conclusions (189)

In his article concerning the post-operative care in prostatectomies, A. Ravich arrives at the following conclusions exemplified in Figure 298.

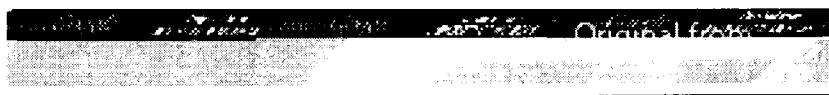
##### SUMMARY

“A new concept of the local physicochemical changes occurring within pathological foci as introduced by Revici, has been briefly described. According to this view, pain is the result of local pH changes brought about by the accumulation of acid or alkaline substances within disturbed tissues. Changes in the lipid balance are associated with and may account for these alterations.

“The possibility of correcting or neutralizing such lipid changes has been explored clinically in several series of urological cases. The favorable effects upon pain as well as upon bleeding, wound healing and other important postoperative problems and complications indicate the need for further study along these lines.”

#### Chapter 14, Note 4. Treatment of Post-traumatic Conditions

Of special theoretical and practical interest has been the treatment of traumatic conditions, especially those following surgical procedures. The recognition of the role of fatty acids acting at different levels of the organization and inducing several different manifestations, has led to the concomitant use of various agents proper to the levels. From the various agents studied, heptanol was thus chosen as acting at the cellular level, glycerol, polyunsaturated alcohols and alkaline amino acids and butanol





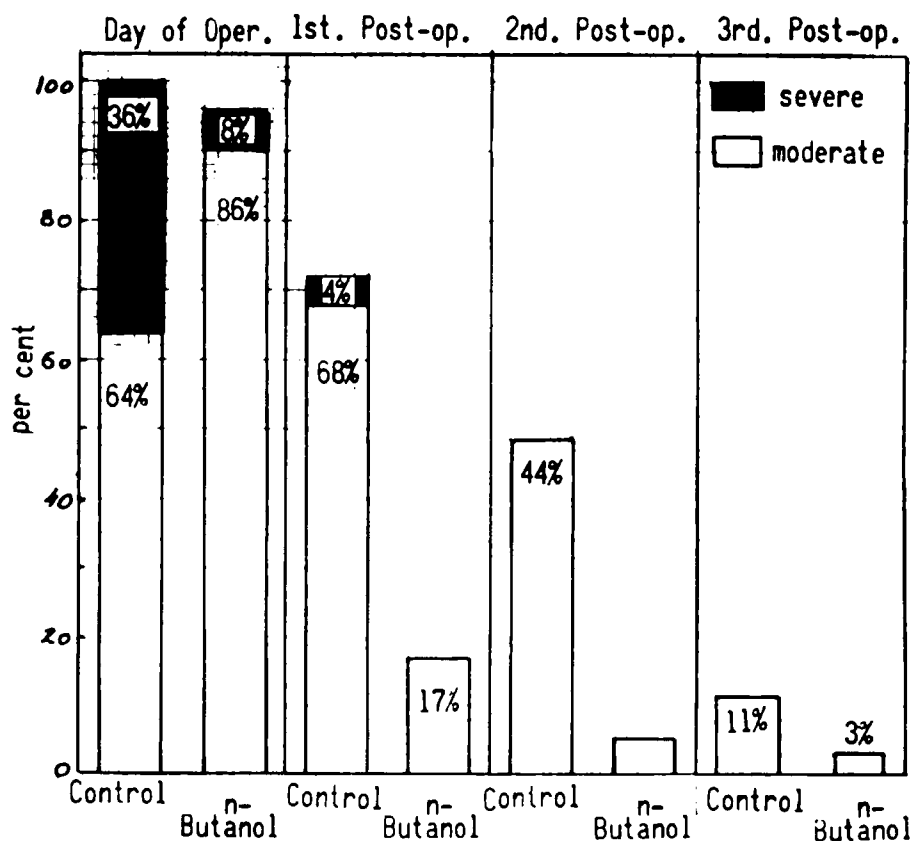


FIG. 298. The administration of n-Butanol after prostatectomy markedly reduces pain. (J. Urol. 62: 629, 1949.)

at the tissular level, glycerophosphoric and organic acids at the systemic level.

The various preparations, obtained by combining or mixing these agents, were administered by intravenous infusions together with glucose and saline or glucose and sodium lactate, in the more severe cases, and intramuscularly or orally in the milder cases. The results obtained with these preparations in hundreds of subjects have been highly satisfactory.

#### Chapter 14, Note 5. Dr. B. Welt's Conclusions on Hearing

In his studies on hearing, Welt arrives at the following conclusions, communicated at the Brooklyn Eye and Ear Society.

"1) The ideas, methods and substances devised by Revici have been applied to the problem of impaired hearing, and have shown significant results in improving that function.

2) The study has confirmed the dualistic concept about pathological foci, namely that a pathological focus may exist in two states of metabolic imbalance, leading either to a local alkaline or acid change.

3) The substances utilized in this study have been effective in influenc-

ing the symptom of impaired hearing, and it is reasonable to believe that the pathological structure has also been influenced to some degree.

4) Revici's ideas of the fatty acid-sterol imbalance have been confirmed by showing that other instances having similar biologic activities, act in the same manner. Their clinical application confirms this.

5) This study shows that both air conduction and bone conduction may be benefited. No method has been found to improve bone conduction up to the present time.

6) From the biochemical and chemotherapeutic point of view, this study indicates that the vestibular labyrinth and the cochlea should be viewed as one organ. Phylogenetic, histological, and this clinical study all tend to support this idea.

7) The study indicates that people up to 60 years of age may obtain normal audiometric hearing if treated early enough. Children and the younger age groups were those that had the highest incidence of good results.

8) Finally, this study has indicated a dual therapeutic attack on a hitherto insoluble problem. It can help us in this otologic problem at any age in life, the formative years, when hearing is vital to the education of the children.

9) It should not be construed or inferred, from this communication, that a cure for hearing is implied. The only conclusion to be drawn is that the author has beneficially influenced the impaired hearing function, or induced a remission for varying periods of time at an improved or normal functional level."

#### Chapter 14, Note 6. Butanol in Plastic Surgery

Following our indications, S. Sher has utilized butanol in post-operative cases. One of the most disagreeable complications seen in plastic surgery of the nose is seventh day bleeding, which while usually not severe, has been known to endanger the lives of several patients. Use of antibiotics has reduced remarkably both incidence and severity of the hemorrhage. However, the prevention of seventh day bleeding has remained a problem for the plastic surgeon. S. Sher has applied our treatment with butanol in almost 2,000 cases. Immediately following surgery, 10 cc. of a 6.5% solution of butanol is injected intramuscularly, the injection being repeated every six hours for the first day. After 24 to 48 hours, the butanol is administered orally in doses of one tablespoonful every four to six hours, and this is continued until after the eighth day following the operation. With this treatment, no severe bleeding has been seen. In several cases when the patient failed to follow instructions and did not continue taking butanol, hemorrhage resulted. In two cases, bleeding was relatively severe, the hemorrhage was brought under control by the intravenous injection of 10 to 20 cc. of the butanol solution. Administration of butanol afterward prevented subsequent bleeding. The value of butanol as a preventive of seventh day hemorrhage thus has been confirmed. (189)

## Chapter 15, Note 1. Radio and Chemotherapeutical Essays

Though carried out only at the beginning of these studies, the application of this method, conducted by Leonard B. Goldman, M.D. in 1950 and 1951 appears interesting. As part of this investigation, lipids were used in association with radiotherapy. In the same research, a group of patients were also treated with lipids alone. A report on this series was presented by L. Goldman as part of a symposium on the therapy of advanced cancer patients, before the Radiological Section of the American Medical Association at its annual convention in Atlantic City on June 14, 1951 (327). His results with patients treated with X-ray and lipids and with lipid therapy alone are summarized in Table XVIA and XVIB.

TABLE XVIA  
RESULTS OF LIPID THERAPY COMBINED WITH IRRADIATION  
(In excess of those expected with irradiation alone)

Type of Malignancy	Total Number	Relief of Symptoms				Temporary Arrest	Regression
		Number	Slight	Moderate	Marked		
Breast	8	7	2	1	4	5	2
Lymphoblastoma	7	4	2	1	1	1	0
Lung	6	5	2	0	3	1	1
Head and Neck	11	4	2	0	2	1	1
Gastro-intestinal	6	4	0	1	3	2	1
Gynecological	3	3	1	1	1	1	0
Genito-urinary	3	0	0	0	0	0	0
Sarcoma	2	1	0	0	1	0	0
Miscellaneous	4	2	1	0	1	1	1
Total	50	30	10	4	16	12	6
		(60%)				(24%)	(12%)

TABLE XVIB  
RESULTS OF LIPID THERAPY ALONE

Type of Malignancy	Total Number	Relief of Symptoms				Temporary Arrest	Regression
		Number	Slight	Moderate	Marked		
Breast	14	7	1	0	6	2	2
Lymphoblastoma	8	5	0	0	5	3	2
Lung	3	3	0	0	3	0	0
Head and Neck	3	2	1	0	1	0	0
Gastro-intestinal	6	3	1	1	1	0	0
Gynecological	3	1	0	0	1	1	1
Sarcoma	1	0	0	0	0	0	0
Miscellaneous	2	2	0	0	2	1	1
Total	40	23	3	1	19	7	6
		(58%)				(18%)	(15%)

## BIBLIOGRAPHY

1. HEITZ, E.: Chromosomes structure. *Z. Indukt. Abstamm. u. Vererb. Lehre* 70:402, 1935.
  2. GEITLER, L.: *Grundriss der Zytologie*. Berlin, 1934.  
GEITLER, L.: *Chromosomenbau*. Berlin, 1938.
  3. NEBEL, B. R.: Chromonemata, number per chromosome. *Cold Spring Harb. Symp. quant. Biol.* 9:7, 1941.
  5. BLIX, M.: Experimental contribution to the solution of the problem of the specific energy of skin nerves. *Ztschr. f. Biol.* 20:141, 1884; also *Ztschr. f. Biol.* 21:145, 1885.
  6. GOLDSCHIEDER, A.: *Gesammelte Abhandlungen*. Leipzig. Barth. 1898.
  7. STRUGHOLD, H.: Concerning the amount and threshold of the pain points of the epidermis in different parts of the body. *Ztschr. f. Biol.* 80:367, 1924.
  8. von FREY, M.: *Abhandlungen der mathematisch-physischen Classe der K. Sachsichen Gesellschaft der Wissenschaften*. Leipzig. Bei S. Hirzel (III) 23:239, 1896.
  9. WOOLARD, H. H.: Intradermal nerve endings. *J. Anat.* 71:54, 1936.
  10. LEWIS, T.: *Pain*. MacMillan, New York, 1942.
  11. von FREY, M.: Investigation of pain-causing stimuli. *Ztschr. f. Biol.* 76:1, 1922.
  12. LEWIS, T., and HESS, W.: Pain derived from skin and mechanism of its production. *Clin. Sc.* 1:39, 1933-4.
  13. SCHUMACHER, G. A.: The influence of inflammation on the pain threshold of the skin in man. *Proc. Assoc. Res. Nerv. Ment. Dis.* 23:166, 1943.
  14. TOWER, S. S.: Pain. Definition and properties of the unit for sensory reception. *Proc. Assoc. Res. Nerv. Ment. Dis.* 23:16, 1943.
  15. LEWIS, T.: Nocifensor system of nerves and its reactions. *Brit. M. J.* 1:431, and 491, 1937.
  16. WOLF, S., and WOLFF, H. J.: Pain arising from the stomach and mechanisms underlying symptoms. *Proc. Assoc. Res. Nerv. Ment. Dis.* 23:789, 1943.
  17. WEDDELL, G.: Multiple innervation of sensory spots in skin. *J. Anat.* 75:441, 1941.
  18. HEAD, H.: *Studies in Neurology*. London. Henry Frowde, Hodder-Stoughton, Ltd. 1920.
- ADRIAN, F. D.: Afferent impulses in the organs and their effect on respiration. *J. Physiol.* 79:332, 1933.

19. FENG, T. P.: Reversible inexcitability of tactile endings in skin injury. *J. Physiol.* 103, 1933.
21. HARRISON, T. R.: *Failure of the Circulation*, p. 160, Baltimore, 1935.  
HALDANE, J. S., and PRIESTLY, J. D.: *Respiration*. Oxford, 1935.
22. CHRISTIE, R. V.: Dyspnea. A review. *Quart. J. Med.* 7:421, 1938.
23. REVICI, E.: Oxybiotic imbalances in biology. Role of lipids. *Monaco-Mediterranee Med.* 8:1, 1941 (extra supplement).
24. DEBYE, P.: *Polar Molecules*. New York. Chem. Catalog, 1929.  
KARRER, P.: *Organic Chemistry*. New York. Elsevier Publ. Co., p. 71, 1947.
25. LE FEVRE, R. J. W.: *Dipole Moments*. New York. Chem. Publ. Co., 1938.
26. PENNY, W. G.: *The Quantum Theory of Valency*. London. Methuen, 1935.  
SIDGWICK, N. V.: *The Electronic Theory of Valency*. Oxford. Clarendon Press, 1929.  
GORTNER, R. A.: *Outlines of Biochemistry*. London. Wiley & Son, 1947.
28. LEA, C. H.: Rancidity in edible fats. *D. S. I. R. Food investigation special report No. 46*. London, 1938; U. S. A., 1939.
30. FARMER, E. H.: *J. Chem. Soc.* 121, 139, 185, 518, 1942.
31. FARMER, E. H., and SUTTON, D. A.: *J. Chem. Soc.* 119, 122, 541, 1943.  
BOLLAND, J. L., and KOCH, H. P.: *J. Chem. Soc.* 445, 1945.  
ATHERSON, D., and HILDITCH, T. P.: *J. Chem. Soc.* 105, 1944.
32. GUNSTONE, F. D., and HILDITCH, T. P.: *J. Chem. Soc.* 836, 1945.
33. LAPWORTH, A.: *J. Chem. Soc.* 121:417, 1922.  
INGELHOLD, C.: *Chem. Rev.* 15:233, 1934.
35. KARRER, *see* 24.
37. REVICI, E.: Pathogenesis of infectious diseases. *Bull. Soc. Med. Hopitaux*, Bucharest, 1919.
38. REVICI, E.: Concerning the pathogenesis of contagious diseases. *Rev. Med. Pasteur* 15:5, 1942.
39. FROISIER, J.: *Etude Experim. Recentes Mal. Infect.* Masson Pain. 1935.
40. REVICI, E.: The problem of shock. *Rev. Med. Pasteur* 16:97, 1943.  
RAVICH, R. A., and REVICI, E.: The effect of n-butanol in sodium salt solutions upon shock and the survival of mice exposed to severe extensive thermal burns. *Bull. Am. Soc. Hosp. Pharm.* 8:23, 1951. Presented at annual meeting, A. A. A. S., Dec. 1950.
41. MAWRY, D. T., BRODE, W. R., and BROWN, J. B.: *J. Biol. Chem.* 142:671, 1942.
42. FOX, C. L., and KESTON, A. S.: The mechanism of shock from burns and trauma traced with radiosodium. *Surg. Gynec. & Obst.* 80:561, 1945.  
FOX, C. L., and BAER H.: Redistribution of potassium, sodium and water in burns and trauma, and its relation to the phenomena of shock. *Am. J. Physiol.* 151:155, 1947.



43. SCHMIDT, O.: Density distribution and energy spectrum of B-electrons: IV. Mechanism of the excitation process in cancerous and healthy cells. *Ztschr. f. physikal Chem. B* 44:194, 1939.  
 SCHMIDT, O.: Characterization and mode of action of the carcinogenic hydrocarbons. *Naturwiss* 29:146, 1941.  
 SCHMIDT, O.: The mechanism of action of carcinogenic organic substances. *Tumori* 27:475, 1941.  
 SCHMIDT, O.: Relation between density distribution of definite balance electrons (B-electrons) and reactivity of aromatic hydrocarbons. *Ztschr. f. physikal Chem. B* 39:59, 1938.  
 SCHMIDT, O.: The characterization of simple and carcinogenic aromatic hydrocarbons by the density distribution of definite valence electrons (B-electrons). *Ztschr. f. physikal Chem. B* 42:83, 1939.
44. PULLMAN, A.: A relation between the distribution of electronic charges and the carcinogenic potency of a certain class of hydrocarbons. *Comp. Rend. Acad. d. Sc.* 221:140, 1945.  
 DAUDEL, P., and DAUDEL, R.: On the physico-chemical theory of the mechanism of action of carcinogenic substances. *Acta Un. Int. Cancer* 6:20, 1948.  
 DAUDEL, P., and DAUDEL, R.: The possible formation of a complex between carcinogenic substances and the tissues. *Bull. Soc. Chim. Biol.* 31:353, 1949.  
 DAUDEL, P., and DAUDEL, R.: Application of wave-mechanics to the study of the mechanism of action of carcinogenic substances on the tissues. *Biol. Med.* 39:201, 1950.  
 DAUDEL, P., DAUDEL, R., and BUU-HOI, N. P.: The problem of predicting the carcinogenic property of chemical substances. *Acta Un. Int. Cancer* 7:91, 1950.  
 DAUDEL, P., DAUDEL, R., BUU-HOI, N. P., and MARTIN, M.: Molecular diagrams of mesomerism and reactivity of organic molecules. *Bull. Soc. Chim. Fr.* 15:1202, 1948.
45. WATERS, A. W.: *Physical Aspects of Organic Chemistry*. van Nostrand Co., New York, p. 39, 1950.
46. BOYLAND, E., and BRUES, A. M.: The carcinogenic action of dibenz-carbazoles. *Proc. Roy. Soc. S. B.* 122:429, 1937.
47. BIELSCHOWSKY, F.: Distant tumors produced by 2-amino- and 2-acetyl-aminofluorine. *Brit. J. Exper. Path.* 25:1, 1944.
48. ENGEL, R. W., and COPELAND, D. H.: Mammary carcinoma in rats fed 2-acetyl-aminofluorine. *Science* 108:336, 1948.
49. MORRIS, H. P., DUBNICK, C. S., DUNN, T. B., and WESTFALL, B. B.: Some observations on carcinogenicity distribution and metabolism of N-acetyl-2 aminofluorine in rats. *Acta Un. Int. Cancer* 6:47, 1948.
- POTTER, V. R., LE PAGE, G. A., and KLUG, H. L.: The essay of animal tissues for respiratory enzymes. VII: Oxalacetic acid oxidation and the coupled phosphorylation in isotonic homogenates. *J. Biol. Chem.* 175:619, 1948.

- ELLIOT-GREENSTEIN, J. P.: The biochemistry of malignant tissues. *Am. Rev. Biochem.* 14:643, 1945.
- STERN, K., and WILLHEIM, R.: *The Biochemistry of Malignant Tumors*. Brooklyn, New York. Reference Press, 1943.
- WEINHOUSE, S., MILLINGTON, R. H., and WENNER, C. E.: Occurrence of the citric acid cycle in tumors. *J. Am. Chem.* 72:4332, 1950.
50. ARMSTRONG, E. C., and BONSER, G.: Epithelial tumors of the urinary bladder in mice induced by 2-acetyl-aminofluorine. *J. Path. & Bact.* 56:507, 1944.
51. BIELSCHOWSKY, F., and GREEN, H. N.: An induced carcinoma in the fowl. *Nature* 156:780, 1945.
52. BIELSCHOWSKY, F.: The carcinogenic action of 2-acetyl-aminofluorine and related compounds. *Brit. M. Bull.* 4:382, 1947.
53. TILAK, B. D.: In 23rd Annual Report of the *British Empire Cancer Campaign*, 109, 1946.
- TILAK, B. D.: Sulphur isosters of carcinogenic hydrocarbons: I. *Proc. Indian Acad. Sci.* 33 A:131, 1951.
54. COOK, J. W., HEWETT, C. L., KENNAWAY, E. L., and KENNAWAY, N. M.: Effects produced in the livers of mice by azonaphthalenes and related compounds. *Am. J. Cancer* 40:62, 1940.
55. HADDOW, A., HARRIS, R. J. C., KON, G. A. R., and ROE, E. M. F.: The growth inhibitory and carcinogenic properties of 4-aminostilbene and derivatives. *Phil. Trans. Roy. Soc. A.* 241:147, 1948.
56. DODDS, E. C., GOLDBERG, L., LAWSON, W., and ROBINSON, R.: Oestrogenic activity of certain synthetic compounds. *Nature* 141, 1938.
57. ROBSON, J. M., and SCHONBERG, A.: Oestrous reactions including mating, produced by triphenyl ethylene. *Nature* 140:196, 1937.
58. NETTLESHIP, A., and HENSHAW, P. S.: Induction of pulmonary tumors in mice with ethyl carbamate (urethane). *J. Nat. Cancer Inst.* 4:309, 1943.
59. LARSEN, C. D., and HESTON, W. E.: Induction of pulmonary tumors in mice by anesthetic agents. *Cancer Research* 5:592, 1945.
60. LARSEN, C. D.: Evaluation of the carcinogenicity of a series of esters of carbamic acid. *J. Nat. Cancer Inst.* 8:99, 1947 a.
- LARSEN, C. D.: Pulmonary-tumor induction by transplacental exposure to urethane. *J. Nat. Cancer Inst.* 8:63, 1947 b.
61. LARSEN, C. D.: Pulmonary-tumor induction with alkylated urethanes. *J. Nat. Cancer Inst.* 9:35, 1948.
- GESSEL, R., KRUGER, H., GORHAM, G., and BERNTHAL, T.: The regulation of respiration. *Am. J. Physiol.* 94:387, 1930.
- COOK, L. C., and HURST, R. H.: Blood lactic acid in blood during rest. *J. Physiol.* 79:443, 1933.
- WARBURG, O.: Experiments in surviving carcinoma tissue: Methods. *Biochem. Ztschr.* 142:317, 1923.
- WARBURG, O.: *The Metabolism of Tumors*. London, 1930.

- CORI, C. F., and CORI, G. T.: The carbohydrate metabolism of tumors: I. The free sugar, lactic acid, and glycogen content of malignant tumors. *J. Biol. Chem.* 64, 1925.
- DICKENS, F.: Cancer as a problem in tissue metabolism. *Cancer Rev.* 57, 1931.
- ELLIOT, K. A. C.: *Symposium on respiratory enzymes*. Madison, Wisc. Univ. of Wisconsin Press, 1942.
- WARBURG, O.: On the origin of cancer cells. *Science* 123:309, 1956.
- WARBURG, O.: On respiratory impairment in cancer cells. *Science* 124:-267, 1956.
- BURK, D., and SCHADE, A. L.: On respiratory impairment in cancer cells. *Science* 124:267, 1956.
- ADAMS, D. H., and QUASTEL, J. H.: Factors influencing the anaerobic glycolysis of brain and tumour. *Proc. Roy. Soc. (B)*, 145:472, 1956.
62. BURK, D.: Colloquial consideration of the Pasteur and neo-Pasteur effects. *Cold Spring Harbor Symposia on Quant. Biol.* 7:420, 1939. *Symposium on Respiratory Enzymes*. Madison, Wisconsin. Univ. of Wisconsin Press, 1942.
- ORR, J. W.: The induction of pulmonary adenomata in mice by urethane. *Brit. J. Cancer* 1:311, 1947.
63. ALEXANDER, P.: The reactions of carcinogens with macromolecules. *Advanc. Cancer Res.* 2:1, 1954.
- BURCHENAL, J. H., LESTER, R. A., RILEY, J. B., and RHOADS, C. P.: Studies on the chemotherapy of leukemia: I. Effect of certain nitrogen mustards and carbamates on transmitted mouse leukemia. *Cancer* 1:329, 1948.
- BURNOP, V. C. E., RICHARD, D. E., WATKINS, W. M., and WORMALL, A.: Combination of nitrogen-15, labelled nitrogen mustard with proteins. *Nature* 168:251, 1951.
- CAMERON, G. R., COURTICE, F. C., and JONES, R. P.: The effects of BB'-dichloro-diethyl-methylamine hydrochloride on the blood forming tissues. *J. Path. & Bact.* 54:425, 1947.
- ROSS, W. C. J.: The chemistry of cytotoxic alkylating agents. *Advances in Cancer Research*. New York. Academy Press, 1952, Vol. 1.
- BURCHENAL, J. H., and RILEY, J. B.: Relation between structure and activity in the nitrogen mustards. *Cancer Research* 9:553, 1949.
65. BURCHENAL, J. H., RILEY, J. B., and LESTER, R. A.: Studies on the chemotherapy of transmitted leukemia in mice. *Acta Un. Int. Cancer* 6:448, 1949.
66. BURCHENAL, J. H.: The newer nitrogen mustards in the treatment of leukemia. *Radiology* 50:494, 1948.
- BURCHENAL, J. H., BURCHENAL, J. R., and JOHNSTON, S. F.: Chemotherapy of leukemia III. Further studies on the effect of nitrogen mustards and related compounds on transmitted mouse leukemia. *Cancer* 4:353, 1951.
67. LANDING, B. H., and EISENBERG, F. F.: Nitrogen mustards. Statistical analysis of effects on Sarcoma 180 and viscera of normal mice in relation to toxicity and structure. *Cancer* 2:1083, 1949.





68. LANDING, B. H., GOLDIN, A., NOE, H. A., GOLDBERG, B., and SHAPIRO, D. M.: Systemic pathological effects of nitrogen mustards, and a comparison of toxicity, chemical structure, and cytotoxic effect, with reference to the chemotherapy of tumors. *Cancer* 2:1055, 1949.
- HADDOW, A., and ROSS, W. C. J.: Tumour growth-inhibiting alkyl sulfonates. *Nature* 177:995, 1956.
- HADDOW, A.: Mode of action of the nitrogen mustards. *Proc. 1st Nat. Cancer Conf.* p. 88, 1949.
- HADDOW, A.: Recent progress in the study of chemical carcinogenesis. *Proc. 2nd Nat. Cancer Conf.* p. 79, 1952.
- HADDOW, A.: The chemical and genetic mechanisms of carcinogens, I. *The Physiopathology of Cancer*, ed. F. Homburger and W. W. Fishman. London and Toronto, 1953.
- HADDOW, A.: The biochemistry of cancer. *Ann. Rev. Biochem.* 24:689, 1955.
69. ROUS, P.: Transmission of a malignant new growth by means of a cell-free filtrate. *J. A. M. A.* 56:198, 1911.
- ROUS, P.: Resistance to a tumor-producing agent as distinct from resistance to the implanted tumor cells. *J. Exper. Med.* 18:416, 1913.
- ROUS, P.: The nearer causes of cancer. *J. A. M. A.* 122:573, 1943.
71. BITTNER, J. J.: Some possible effects of nursing on mammary gland tumor incidence in mice. *Science* 84:162, 1936.
72. HESTON, W. E., and DERINGER, M. K.: Test for a maternal influence in the development of mammary gland tumors in agents-free strain C<sub>3</sub>H mice. *J. Nat. Cancer Inst.* 13:167, 1952.
73. DMOCHOWSKI, L.: The milk agent in the origin of mammary tumors in mice. *Adv. Cancer Res.* 1:103, 1953.
74. LURIA, S. E.: Bacteriophage: an essay of virus reproduction. *Science* 111:507, 1950.
76. LWOFF, A., and GUTTMAN, A.: Recherches sur un Bacillus Megatherium lysogene. *Ann. Inst. Pasteur* 78:711, 1950.
- LWOFF, A.: Lysogeny. *Bact. Rev.* 17:270, 1953.
- JACOB, F.: *Les Bacteries Lysogenes*. Paris, 1954.
78. NICOLAU, S.: Herpes. *Les Ultravirus des Maladies Humaines*. Edit. C. Levaditi, and P. Lepine. Paris, Maloine, 1943.
80. LEPINE, P., and LAFFORET-FURIET, J.: Papillome de Shope. *Les Ultravirus des Maladies Humaines*. Paris, Maloine, 1943.
81. SHOPE, R.: Infectious papillomatosis of rabbits. *J. Exper. Med.* 58:607, 1933.
82. DURAN-REYNALS, F.: Neoplastic infection and cancer. *Am. J. Med.* 8:490, 1950.
83. ANDERSON, K.: Pathogenesis of herpes simplex infection in chick embryos. *Am. J. Path.* 16:137, 1940.
84. AHLSTROM, C. G.: On the anatomical character of the infectious myxoma of rabbits. *Acta Path. et Microbi. Scandinav* 17:377, 1940.

85. BONNET, S. C. J., HORGAN, E. S., and MANSUR ALI HASEE, B.: The pox diseases of sheep and goats. *J. Comp. Path. & Therap.* 54:133, 1944.  
GLOVER, R. E.: Contagious pustular dermatitis of the sheep. *J. Com. Path. & Therap.* 54:131, 1944.
86. DURAN-REYNALS, F., and SHRIGLEY, E. W.: Virus infection as an etiological agent of cancer. *A. A. A. S. Research Conference on Cancer* p. 1, 1944.
87. DURAN-REYNALS, F.: Immunological factors that influence the neoplastic effects of the rabbit fibroma virus. *Cancer Research* 5:25, 1945.
88. DURAN-REYNALS, F.: A hemorrhagic disease occurring in chicks inoculated with the Rous and Fuginami viruses. *Yale, J. Biol. & Med.* 13:77, 1940.  
KARNOFSKY, D. A., PARISSETTE, L. M., PATTERSON, P. A., and JACQUEZ, J. A.: The behavior and growth of homologous and heterologous normal and neoplastic tissues in the chick embryo; and the influence of various agents on tumor growth. *Acta. Unio. Internat. Contra Cancerum* Asta 6:641, 1949.
- MILFORD, J. S., and DURAN-REYNALS, F.: Growth of a chicken sarcoma virus in the chick embryo in the absence of neoplasia. *Cancer Research* 3:578, 1943.
89. BLAKEMORE, F.: Further observations on the demonstration of an infective agent in the tissues of fowls affected with fowl paralysis (neurolymphomatosis). *J. Comp. Path. & Therap.* 55:1, 1945.
90. PAPPENHEIMER, A. W., DUNN, L. C., CONE, V., and SEIDLIN, S. M.: Studies on fowl paralysis (neurolymphomatosis gallinarum): I. Clinical features and pathology. *J. Exper. Med.* 44:63, 1929.
91. JACKSON, C.: Relationship of glioma to encephalitis in the domestic fowl and associated parasitic agents. *Nature* 161:441, 1948.
92. WATERS, N. F., and BYWATERS, J.: Influence of age of chickens at contact exposure on incidence of lymphomatosis. *Poultry Sci.* 28:254, 1949.  
DURAN-REYNALS, F.: The infection of turkeys and guinea fowls by the Rous sarcoma virus and the accompanying variations of the virus. *Cancer Research* 3:569, 1943.
93. BURMESTER, P. R., PRICKETT, C. O., and BELDING, T. C.: A filtrable agent producing lymphoid tumors and osteopetrosis in chickens. *Cancer Res.* 6:189, 1946.
94. GOTTRAL, G. E.: Avian lymphomatosis, another egg-borne disease. *Proc. 53rd Ann.* 183, 1950.
95. GROSS, L.: Is leukemia caused by a transmissible virus? *J. Hemat.* 9:557, 1954.
96. LAW, L. W.: Recent advances in experimental leukemia research. *Cancer Res.* 14:695, 1954.
97. STEWART, S. E.: Neoplasms in mice inoculated with cell-free extracts or filtrates of leukemia mouse tissue. I. Neoplasms of the parotid and adrenal glands. *J. Nat. Cancer Inst.* 15:1931, 1955.

98. DURAN-REYNALS, F.: The reciprocal infection of ducks and chickens with tumor-inducing viruses. *Cancer Res.* 2:343, 1942.  
DURAN-REYNALS, F.: The age factor in adaptability of a sarcoma virus to other animal species. *Science* 103:748, 1946.
99. CARR, J. G.: The absence of a seasonal influence upon the Rous no. 1 sarcoma in young chicks. *Brit. J. Exper. Path.* 23:339, 1942.
100. ENGELBRETH-HOLM, J.: *Spontaneous and Experimental Leukemia in Animals*. Edinburgh. Oliver and Boyd, Ltd., 1942.
101. BAGG, H. J.: Experimental production of teratoma testis in the fowl. *Am. J. Cancer* 25:69, 1936.
102. DURAN-REYNALS, F., and FREIRE, P. M.: The age of the tumor-bearing hosts as a factor conditioning the transmissibility of a chicken sarcoma by filtrates and cells. (Tentative title of a paper in preparation.)  
FREIRE, P. M., and DURAN-REYNALS, F.: A study of the generalized lesions from a chicken sarcoma in relation to some characteristic of the causative virus. (Tentative title of a paper in preparation.)
103. GROSS, L.: Induction of parotid carcinomas and/or subcutaneous sarcomas in C<sub>3</sub>H mice with normal C<sub>3</sub>H organs extracts. *Proc. Soc. Exper. Biol. & Med.* 88:362, 1955.
104. LAW, L. W., DUNN, T. B., and BOYLE, P. J.: Neoplasms in the C<sub>3</sub>H strain and in F hybrid mice of two grosses following introduction of extracts and filtrates of leukemia tissues. *J. Nat. Cancer Inst.* 16:495, 1955.
105. GROSS, L.: Neck tumors or leukemia, developing in adult C<sub>3</sub>H mice following inoculation in early infancy, with filtered (BERKFELD, N.) or centrifugated (144,000 × 9) A K-leukemic extracts. *Cancer* 6:948, 1953.
106. SHOPE, R. E.: Infectious papillomatosis of rabbits, with note on histopathology. *J. Exper. Med.* 58:607, 1933.
107. OBERLING, C., and GUERIN, M.: The role of viruses in the production of cancer. *Adv. Cancer Res.* 2:253, 1954.
108. BRYAN, W. R., CALNAN, D., and MOLONEY, J. B.: Biological studies on the Rous sarcoma virus. III. The recovery of virus from experimental tumors in relation to initiating dose. *J. Nat. Cancer Inst.* 16:317, 1955.
111. OBERLING, C., and GUERIN, M.: The role of viruses in the production of cancer. *Advanc. Cancer Res.* 2:353, 1954.
112. CAMPBELL, J. C.: Neoplastic disease of the fowl with special references to its history, incidence and seasonal variation. *Comp. Path. & Therap.* 55:308, 1945.  
JUNGHERR, E.: The avian leukosis complex. *Diseases of Poultry*. (H. E. Biester, ed.) Ames, Iowa. State College Press. p. 367, 1943.  
ELLERMAN, V.: *Leucosis of Fowls and Leucemia Problems*. London, Glydendal, 1921.  
LAFFORET-FURIET, J.: Tumeurs de la poule. *Les Ultravirus des Maladies Humaines*. Paris, Maloine, 1943.

113. CARR, J. G.: Some investigations upon the nature of the resistance of an inbred line of fowls to the development of the Rous No. 1 sarcoma. *Brit. J. Exper. Path.* 24:127, 1943.  
     COLE, R. K.: Genetic resistance to the transmissible sarcoma of the fowl. *Cancer Research* 1:714, 1941.
114. WINTON, B.: 11th Annual Report of the *Regional Poultry Research Laboratory*. East Lansing, Michigan, 1950.
115. DURAN-REYNALS, F.: Unpublished observations.
116. PELLER, S.: Cancer and its relationship to pregnancy, to delivery and to marital and social status. *Surg. Gyn. Obst.* 71:1 and 181, 1940.
117. LeSHAN, L., and REZNIKOFF, M.: A psychological factor apparently associated with neoplastic disease. *J. Abn. Soc. Psychol.* 60:439, 1960.
118. LeSHAN, L., and WORTHINGTON, R.: Loss of cathexes as a common psychodynamic characteristic of cancer patients. An attempt at statistical validation of a clinical hypothesis. *Psychol. Rep.* 2:183, 1956.
119. LeSHAN, L., and WORTHINGTON, R.: Some recurrent life history patterns observed in patients with malignant disease. *J. Nerv. Ment. Dis.* 124:460, 1956.
120. LeSHAN, L., and GASSMANN, M.: Some observations on psychotherapy with patients with neoplastic disease. *Am. J. Psychother.* 12:723, 1958.
121. PETSCHKE, H.: Psychosomatic factors and neoplasia. *Z. Psychosomat. Med.* 3:41, 1956.
122. LeSHAN, L., MARVIN, S., and LYERLY, O.: Some evidence of a relationship between Hodgkin's disease and intelligence. *A. M. A. Arch. Gen. Psychiat.* 1:477, 1959.
123. LESHAN, L.: Psychological states as factors in the development of malignant disease. A critical review. *J. Nat. Ca. Inst.* 22:1, 1959.
124. LECLOUX, J.: *Compte rendu Soc. Biol.* 91:1155, 1929.  
     LECLOUX, J.: *Compte rendu Soc. Biol.* 93:832, 1925.  
     LECLOUX, J.: *Cancer Bruxelles* 8:37, 1932.
125. BIERICH, R., and KALLE, K.: *Ztschr. f. Physiol. Chem.* 159:1, 1926.
126. FEINSTEIN, R. N., and STARE, F. J.: *Proc. Soc. Exp. Biol. and Med.* 45:525, 1940.
- 126 MAWSON, C. A.: *Bioch. J.* 31:1592, 1936.
127. HINGERTY, D.: *Bioch. J.* 66:429, 1957.
128. HALDEN, W., and PROKOP, L.: *Cholesterin, Ernährung, Gesundheit*. Munich, 1957.
129. WILLHEIM, R., REVICI, E., FLUSS, P., and AUBER, M.: Further experiments concerning the lytic power of blood serum against ascites tumor cells. *Exper. Med. and Surg.* 17:271, 1959.
130. VOELKEL, H.: Thesis, 1953.
131. SCHNITZLER, B.: *Münchener Medizinische Wochenschrift*. 99:81, 1957.
132. BERSOHN, I., and OELOFSE, P. J.: *Lancet* 272:1020, 1957.

- HALDEN, W., and PROKOP, L.: *Cholesterin, Ernährung, Gesundheit*. Munich, 1957.
133. PILLEMER, L., BLUM, L., LEPOW, I. H., ROSS, O. A., TODD, E. W., and WARDLAW, A. C.: *Science* 120:279, 1954.
- PILLEMER, L., and ROSS, O. D.: *Science* 121:732, 1955.
- PILLEMER, L.: *Ann. N. Y. Acad. Sc.* 66:233, 1956.
134. FLINK, E. B.: *J. A. M. A.* 160:1406, 1956.
135. HORDER, LORD, DODDS, and MORAN: *Bread*. London, 1954.
136. O'DELL, B. L., MORRIS, E. E., and HOGAN, A. G.: *J. of Nutrition* 63:65, 1957.
- DIEHL, J. C., and TROMP, S. W.: *Probleme der geographischen und geologischen Haufigkeitsverteilung der Krebsterblichkeit*. Ulm, 1955.
- ANONYMOUS: *Lancet* 270:31, 1956.
- ANSELL, B. M., REIFFEL, L., STONE, C. A., and KARK, R. M.: *Lancet* 11:464, 1957.
- SPARGO, B.: *J. of the Laboratory and Clinical Medicine* 43:802, 1954.
- TROMP, S. W.: *Report of 5th Conference of the International Society of Geographical Pathology* 929, 1954.
- TROMP, S. W.: *British J. of Cancer* 8:585, 1954.
- TROMP, S. W., and DIEHL, J. C.: *British J. of Cancer* 9:349, 1955.
137. ROBINET, L.: *B. de l'Academie Nationale de Medecine* 103:440, 1930.
138. ROBINET, L.: *B. de l'Academie Nationale de Medecine* 111:501, 1934.
139. TROMP, S. W., and DIEHL, J. C.: *Experientia* 10:510, 1954.
140. HOARE, R., DELORY, G. E., and PENNER, D. W.: *Cancer* 9:721, 1956.
141. BEEBE, S. P.: The inorganic constituent of tumors. *Amer. J. Physiology* 12:167, 1904.
142. CLOWES, G. H., and FRISHE, W. S.: In the relationship between the rate of growth, age and K and Ca content of mouse tumor. *Amer. J. Physiology* 14:173, 1905.
143. SHEAR, M. J.: The role of Na, K, Ca, Mg in cancer. A review. *Amer. J. Cancer* 18:924, 1933.
144. SUNTZEFF, V., and CARRUTHERS, K.: K and Ca in epidermal carcinogenesis induced by methylcholanthrene. *J. Biol. Chem.* 153:-521, 1944.
145. CARRUTHERS, K., and SUNTZEFF, V.: Role of calcium in carcinogenesis. *Science* 99:245, 1944.
146. DE LONG, R. P., COMAN, D. R., and ZEIDMAN, I.: The significance of low calcium and high potassium content in neoplastic tissue. *Cancer* 3:718, 1950.
147. DUNHAM, C.: *A. M. A. Arch. Indust. Health* 13:451, 1956.
150. KEILIN, D., and HARTREE, E. F.: *Nature* 141:870, 1938.
151. COHEN, E., and ELVEHJEM, C. A.: *J. of Biological Chem.* 107:97, 1954.
152. SCHULTZE, M. O., and KUIKEN, K. A.: *J. of Biological Chem.* 137:-727, 1941.

154. BENNETS, H. W.: *Australian Veterinary J.* 8:137, 183, 1932.
155. BURLEY, R. W.: *Nature* 174:1019, 1954.
156. GALLAGHER, C. H., JUDAH, J. D., and RESS, K. R.: *Proc. Roy. Soc. B* 145:134, 1913.
157. BAXTER, J. H., and WYK, J. J. van: *B. of the Johns Hopkins Hospital* 93:1, 1953.
158. BERMAN, D. T., PHILIPPS, P. H., and BRANDLEY, C. A.: *J. of American Veterinary Medical Assn.* 121:46, 1952.
159. BARSHAD, L.: *Soil Science* 71:297, 1951.
160. MARSTON, H. R.: *Physiol. Rev.* 32:66, 1952.
161. ANONYMOUS: *J. of American Veterinary Medical Assn.* 109:288, 1946.
163. CASSIDY, J.: *The Agricultural Merchant*. December, 1952.
164. BINGOLD, K., STICK, W., and CRAMER, H.: *Z. für Krebsforschung* 57:653, 1951.
165. EULER, H. von, and SKARZINSKY, B.: *Biochemie der Tumoren*. Stuttgart, 1942.
166. PIRRIE, R.: *J. of Clinical Pathology* 5:190, 1952.
167. HEILMEYER, L., KEIDERLING, W., and STRUWE, W.: *Kupfer und Eisen als Kuppereigene Wirkstoffe und ihre Bedeutung beim Krankheitsgeschelen*. Iena, 1941.
168. CARTWRIGHT, J. E.: *Copper Metabolism* 274, 1950.
169. PEARSON, O. H., ELIEL, L. P., RAWSON, R. W., DOBRINER, K., and RHOADS, C. P.: *Cancer* 2:943, 1949.
170. SHARPLESS, G. R.: *Federation Proceedings* 5:239, 1946.
171. PEDRERO, E., and KOZELKA, F. L.: *Archives of Pathology* 52:447, 1951.
172. CLAYTON, C. C., KING, H. J., and SPAIN, J. D.: *Federation Proceedings* 12:190, 1953.
174. KRETSCHMER, A. E., and BEARDSLEY, D. W.: *Inorganic Nitrogen Metabolism*. Symposium, Baltimore, 445, 1956.
175. SCAFE, J. F.: *New Zealand J. of Science and Technology* 38A:285, 1956.
176. MASKE, H.: *Experientia* 11:122, 1955.
- COHN, E. J., FERRY, J. D., LIVINGOOD, J. J., and BLANCHARD, H. M.: *Science* 90:183, 1939.
177. FERNER, H.: *Das Inselsystem des Pankreas*. Stuttgart, 1952.
178. OKAMOTO, K.: *Transactions of the Japanese Pathological Society* 32:99, 1942; 33:247, 1943.
179. OKAMOTO, K.: *Tohoku J. of Experimental Medicine* 61 Supplement 111, 1955.
- GAEDE, K., FERNER, H., and KASTRUP, H.: *Klinsche Wochenschrift* 28:883, 1950.
- SHAW-DUNN, J., SHEEHAN, H. L., and McLETCHIE, N. G. B.: *Lancet* 244:484, 1943.
180. STEWART, F. W.: *Texas Reports on Biology and Medicine* 10:239, 1952.
- MAWSON, C. A., and FISHER, M. I.: *Canadian J. of Medical Science* 30:336, 1952.



181. STOCKS, P.: *35th Annual Report of the British Empire Cancer Campaign* Supplement to Part II, 1957.
- VOISIN, A.: Soil, Grass and Cancer. *Phylosoph. Libr.* 1959.
182. REVICI, E.: *Compte Rendu Soc. Biology.* Bucharest, 1918.
183. MARTINEZ, A. B.: Influence of fundamental lipids upon pain. *Rev. Med. Pasteur* 15:24, 1942.
184. REVICI, E.: Considerations concerning the biology of the painful focus. *La Revue de L'Ifal.* 1:114, 1945.
- TURNER, S.: Contributions concerning the biology of painful foci. *Il Policlinico* 53:1168, 1946.
- STOOPEN, E.: Considerations about the pathogenesis of painful foci. *Rev. Med. Pasteur* 17:73, 1944.
- STOOPEN, E.: Some new concepts of biology and therapy (based upon the work of Dr. E. Revici). *Rev. Med. Pasteur* 15:167, 1941.
185. WELT, B.: Head and neck pain: Role of biological imbalance in its pathogenesis and therapy. *A. M. A. Arch. Otolaryng.* 61:280, 1955.
186. WELT, B., and WELT, M.: Pathological pain. A ten-year report of a clinical approach based on a new physiopathological concept. *Mod. Probl. Ophthal.* 648, 1957.
187. WELT, B.: n-Butanol, its use in control of postoperative pain in otorhinolaryngological surgery. *A. M. A. Arch. Otolaryng.* 52:549, 1950.
188. RAVICH, R. A., and RAVICH, A.: Clinical application in urological surgery of a new concept of the physico-chemistry of pathological lesions. *J. Urol.* 62:629, 1949.
189. SCHER, J.: Communication Trafalgar Hospital Pathological Conference, 1959.
190. WELT, B.: Vertigo: A therapeutic approach based on its physiopathological aspect. *A. M. A. Arch. Otolaryng.* 52:273, 1953.
191. WELT, B.: Vertigo: A further contribution to therapy based upon its physiological aspect. *A. M. A. Arch. of Otolaryng.* 63:25, 1956.
192. WELT, B.: Hearing impairment lecture at the Kings County Med. Soc. May 1959.
193. REVICI, E., RAVICH, R.: Anti-hemorrhagic action of n-butanol in advanced cancer. *Angiology* 4:510, 1953.
198. KIRBY, A. H. M.: Attempts to induce stomach tumors, 1. The effect of cholesterol heated to 300°C. *Cancer Research* 3:519, 1943.
- ROFFO, A. H.: Accion cancerigena de los derivados fenantrenicos del colestero. *Bol. Inst. de med. exper. para el estud. y trat. d. cancer* 15:837, 1938.
- ROFFO, A. H.: Tumeurs malignes developpees dans l'appareil digestif par l'ingestion des graisses oxydees par chauffage. *Bull. Assoc. franc. p. l'etude du cancer* 28:556, 1939.
- ROFFO, A. H.: Krebszerzeugende Wirkung des aus dem Cholesterin gewonnenen Phenanthrenderivatives. *Ztschr. f. Krebsforsch.* 49:341, 1939.
- ROFFO, A. H.: Pirölis del colestero; alquiträn cancerigeno del colestero. *Bol. Inst. de med. exper. para el estud. y trat. d. cancer* 18:929, 1941.

- HIEGER, I.: Cholesterol as carcinogen. *Proc. Roy. Soc. (B)* 84:147, 1957.
- HIEGER, I., and ORR, S. F. D.: Cholesterol as a carcinogen. *Brit. J. Cancer* 8:274, 1954.
199. MARIANI, J.: The Liposides. II. A study of their physico-mathematical properties. *Inst. of App. Biol.* 1:62, 1954.
200. POWELL, C. F.: *Report of the International Physics Conference*. Copenhagen 3:17, 1952.
201. HARVEY, E. M.: *Plant Physiological Chemistry*. New York, 1930.
202. HOFFMANN, W. S.: Clinical physiology of potassium. *J. A. M. A.* 144:-1157, 1950.
203. YOSIDA, T. H.: Origin of V-shaped chromosomes occurring in tumour cells. *Proc. Imp. Acad. Japan* 31:237, 1955.
- STEWART, H. L., and LORENZ, E.: Histopathology of induced pre-cancerous lesions of the small intestine of mice. *J. Nat. Cancer Inst.* 7:239, 1947.
- STRONG, L. C., COLLINS, V. J., and DURAND, E. A.: Genetic analysis of induction of various types of gastric lesions. *Cancer Research* 3:21, 1943.
- TSUNODA, T.: Uber die Histogenese des multiplen beginnenden Magenkrebses. *Ztschr. f. Krebsforsch.* 9:436, 1910.
- FIROR, W. M., and GEY, G. O.: Observations on the conversion of normal into malignant cells. *Ann. Surg.* 121:700, 1945.
- STEWART, H. L.: Experimental alimentary tract cancer. *The Pathophysiology of Cancer*. Ed.: F. Homburger, W. Fishman, and H. Hoeber. Harper Books, New York, 1953.
- STEWART, H. L., and ANDERVONT, H. B.: Pathologic observations on the adenomatous lesion of the stomach in mice of strain 1. *Arch. Path.* 26:1009, 1938.
204. STEWART, H. L., HARE, W. V., LORENZ, E., and BENNETT, J. H.: The induction of adenocarcinoma and other lesions of glandular stomach in rats by intramural injection of 20-methylcholanthrene. (abstract) *Cancer Research* 9:618, 1949.
- STEWART, H. L., and LORENZ, E.: Induction of adenocarcinoma of the pyloric stomach in mice by methylcholanthrene. *J. Nat. Cancer Inst.* 2:193, 1941.
- LORENZ, E.: Preparation of emulsions and suspensions containing carcinogenic hydrocarbons. *J. Nat. Cancer Inst.* 10:355, 1949.
- BECK, S.: The effect of feeding carcinogenic hydrocarbons dissolved in aqueous soap solution on the stomach of CBA mice. *Brit. J. Exper. Path.* 27:155, 1946.
- STEWART, H. L., and LORENZ, E.: Morbid anatomy, histopathology and histopathogenesis of forestomach carcinoma in mice fed carcinogenic hydrocarbons in oil emulsions. *J. Nat. Cancer Inst.* 10:147, 1949.
205. FREMONT-SMITH, M., GRAHAM, R. M., and MEIGS, J. V.: Early diagnosis of cancer by study of exfoliated cells. *J. A. M. A.* 138:469, 1948.



- GRAHAM, R. M., and MCGRAW, J.: Investigation of "false-positive" vaginal smears. *Surg. Gynec. & Obstet.* 90:221, 1950.
- GRAHAM, R. M., STURGIS, S. H., and MCGRAW, J.: A comparison of the accuracy in diagnosis of the vaginal smear and the biopsy in carcinoma of the cervix. *Am. J. Obstet. & Gynec.* 55:303, 1948.
- PIND, E. R., and HUERBACH, S. H.: Preinvasive carcinoma of cervix uterin. *J. A. M. A.* 131:960, 1946.
- KAPIER, S. J.: Diagnosis of preinvasive carcinoma of the cervix. *Surg. Gynec. & Obst.* 89:405, 1949.
- DANIELS, E. A.: Precancerous lesions of the rectum and sigmoid. *Internat. Clin.* 2:140, 1939.
- MALORY, T. B.: Carcinoma in situ of the stomach and its bearing as the histogenesis of malignant ulcers. *Arch. Path.* 30:348, 1940.
- FENNELL, R. H., and CASTLEMAN, B.: Carcinoma in situ. *New Engl. J. Med.* 252:985, 1955.
206. SAPHIR, O.: Cytological diagnosis of cancer from pleural and peritoneal fluids. *A. M. J. Clin. Path.* 19:309, 1949.
207. PAPANICOLAU, G. N., and TRAUT, H. F.: *Diagnosis of Uterine Cancer by the Vaginal Smear*. New York, Commonwealth Fund, 1943.
- PAPANICOLAU, G. N., FRANT, H. F., and MARCHETTI, A. A.: *Epithelia of Woman's Reproductive Organs: A correlative study of cyclic changes*. New York, Commonwealth Fund, 1948.
- PAPANICOLAU, G. N.: A new procedure for staining vaginal smears. *Science* 95:438, 1942. Staff of Vincent Memorial Laboratory. *The Cytologic Diagnosis of Cancer*. Philadelphia, W. B. Saunders Co., 1950.
208. GUSBERG, S. B.: Detection of early carcinoma of the cervix. The Coning biopsy. *Am. J. Obst. & Gynec.* 57:752, 1949.
- OXOM, H.: Cervical cytology. Key to diagnosis of early uterine cancer. *Surg. Gynec. and Obstet.* 87:197, 1948.
- FOOTE, F. W., and LI, K.: Smear diagnosis of in situ carcinoma of the cervix. *Am. J. Obstet. & Gynec.* 56:335, 1948.
- KOLLER, P. C.: Cytological variability in human carcinomatosis. *Ann. N. Y. Acad. Sci.* 63:793, 1956.
209. PITTS, R. F., LOTSPEICH, W. D., SCHIESS, W. A., and AYER, J. L.: The renal regulation of acid-base balance in man. I. The nature of the mechanisms for acidifying the urine. *J. Clin. Invest.* 27:48, 1948.
210. BODANSKY, M.: *Introduction to Physiological Chemistry*. 4th ed. New York. John Wiley and Sons, p. 260, 1938.
211. FITZ, R. and VAN SLYKE, D. D.: Studies on acidosis. IV. The relationship between alkaline reserve and acid excretion. *J. Biol. Chem.* 30:389, 1917.
212. GAMBLE, J. L.: *Chemical Anatomy, Physiology and Pathology of Extracellular Fluid*. Cambridge, Harvard Univ. Press, 1949.
- GERSHENFELD, L.: *Urine and Urinalysis*. Romaine Pierson Publ. Co., New York, p. 48, 1948.

- SELLARDS, A. W.: *The Principles of Acidosis and Clinical Methods for its Study*. Cambridge, Harvard Univ. Press, 1919.
- REVICI, E., HUESCA-MEJIA, C., and RAVICH, R. A.: Correlation between pH of urine and blood titrimetric alkalinity. *Bull. Inst. Appl. Biol.* 1:39, 1949.
214. RASCHIG, F.: *Berichte* 48, 2088.
215. du NOUY, P. L.: Surface equilibria of biological and organic colloids. *Am. Chem. Soc. Monograph No. 27*, New York, 1926.
- du NOUY, P. L.: *J. Gen. Physiol.* 1:52, 1919.
216. ANDREAS, J. M., HAUSER, E. A., and TUCKER, W. B.: Boundary tension by pendant drops. *J. Phys. Chem.* 42:1001, 1938.
- SMITH, G. W., and SORG, L. L.: Measurement of boundary tension by the pendant drop method. *Phys. Chem.* 45:671, 1941.
217. FEIGL, F.: *Z. Analyt. Chem.* 74:369, 1928.
218. BIER, M., and TEITELBAUM, P.: A new method for the determination of sulfhydryl levels and their variations in the blood of rats. Presented at the 126th Meeting, Am. Chem. Soc., New York, 1954.
219. RAVICH, R. A., and RAVICH, A.: Study of the urinary surface tension and protective colloids in urolithiasis: use of the Revici urotensiometer. *J. Urol.* 72:1050, 1954.
220. REVICI, E.: Oxybiotic imbalances in biology. Role of lipids. *Monaco-Mediterranean Med.* 8:1, 1941 (extra supplement).
- STOOPEN, E.: Action of fundamental lipids upon the reduction index of urine. *Rev. Med. Pasteur* 15:22, 1942.
- OROZCO, C. F.: Relationship of the reduction index and other urine findings. *Rev. Med. Pasteur* 15:27, 1942.
221. REVICI, E., and LA BURT, H. A.: Observations on a new approach to the biological aspect of mental diseases. Abstract in *13th Ann. Report*, Creedmoor State Hosp., 1948.
222. OROZCO, C. F.: The Revici reaction. Thesis, Univ. of Guadalajara, Mexico, 1943.
- THEILER, R.: Concerning the Revici reaction in the urine. Thesis, Faculty of Medicine of Paris, 1940.
223. REVICI, E., HUESCA-MEJIA, C., and RAVICH, R. A.: The measurement of the pH of experimentally produced wounds as a method for the study of abnormal foci. *Bull. Inst. Appl. Biol.* 1:73, 1949.
- REVICI, E.: The influence of irradiation upon unsaturated fatty acids. Presented at 6th International Congress of Radiology, London, July, 1950.
- MAC INNES, D. A., and DOLE, M.: Tests of a new type of glass electrode. *J. Ind. & Eng. Chem., Anal. Ed.* 1:57, 1929.
224. DUSSER de BARENNE, J. G., McCULLOUGH, W. S., and NIMS, L. F.: Functional activity and pH of the cerebral cortex. *J. Cell. and Comp. Physiol.* 10:277, 1937.
225. BLANK, I. H.: Measurement of pH of the skin surface, I. Technique. *J. Invest. Derm.* 2:67, 1939.

226. BLOOR, W. R.: Biochemistry of the fatty acids. Reinhold Publ. Co., New York, 1943.
227. MARIANI, J.: The Liposides: II. A study of their physico-mathematical properties. *Bull. Inst. Appl. Biol.* 1:62, 1949.
228. FREY-WYSSLING, A.: *Submicroscopic Morphology of Protoplasm*. Elsevier Co., New York, p. 206, 1953.
230. KARRER, P.: *Organic Chem.* Elsevier Co., New York, 1947.
231. TASKIER, E. F., REVICI, E., and WILLHEIM, R.: Measure of adrenal defense against various fatty acids. 136th Meeting, Am. Chem. Soc., Sept., 1959.
232. OPPENHEIMER, C.: *Chemische Grundlage der Lebensvorgänge*. Leipzig, 1933.
- OPPENHEIMER, C.: *Handbuch Biochemie*. Egan Zungwerk, Iona, 1933.
- THOMAS, P.: *Manuel de Biochimie Masson*. Paris, Chapter XXX, 1936.
233. QUICK, A. J.: *J. Biol. Chem.* 96, 1952.
235. QUICK, A. J.: *J. Biol. Chem.* 97, 1932.
- QUICK, A. J.: *J. Biol. Chem.* 98, 1932.
237. REVICI, E., and RAVICH, R.: Surface tension of urine in old age. *Geriatrics* 9:386, 1954.
238. EBSTEIN, W.: *Die Natur und Behandlung der Harnsteine*. J. F. Bergmann, Wiesbaden, 1884.
239. JULY, J. S.: *Stone and Calculous Disease of the Urinary Organs*. C. V. Mosby, St. Louis, 1929.
240. BUTT, A. J.: Role of protective colloids in prevention of renal lithiasis. *J. Urol.* 67:450, 1952.
241. BUTT, A. J., HAUSER, E. A., and SEIFTER, J.: Effect of hyaluronidase on urine and its possible significance in renal lithiasis. *J. A. M. A.* 150:1096, 1952.
242. BUTT, A. J., HAUSER, E. A., and SEIFTER, J.: Renal lithiasis: its treatment and prevention by increasing urinary colloids with hyaluronidase. *Georgia J. M. A.* 41:185, 1952.
243. REVICI, E.: Some general considerations of the role of lipids in blood physiology. Presented at the Gordon Research Conference, Kimball Academy, Meriden, New Hampshire, June, 1955.
244. REVICI, E.: Studies on paroxysmal hemoglobinuria. *Rev. Med. Pasteur* 15:12, 1942.
245. PILLEMER, L., BLUM, L., LEPOW, I. H., ROSS, O. A., TODD, E. W., and WARDLAW, A. C.: The properdin system and immunity I. *Science* 120:279, 1954.
- PILLEMER, L., BLUM, L., LEPOW, I. H., ROSS, O. A., TODD, E. W., and WARDLAW, A. C.: The properdin system and immunity II. *Science* 122:545, 1955.
- WILLHEIM, R., IVY, A. C., and JANECEK, H. M.: Cytolysis of Ehrlich ascites carcinoma cells by normal human blood sera. *J. Exper. Med. Surg.* 15:300, 1957.
246. WILLHEIM, R.: Lytic influence of serum on cancer cells. 7th Intern. Cancer Congress. London, 1958.
247. WILLHEIM, R., REVICI, E., and AUBER, M.: Further experiments concerning the lytic power of blood serum against ascites tumor cells. *Fed. Proc.* 18, No. 2374, 1959.

248. WILLHEIM, R., O'MALLEY, B., and FLUSS, P.: Chemistry of carcinolysis. 138th Meeting A. C. S., September, 1960.
250. ELKINTON, J. R., WINKLER, A. W., and DANOWSKI, T. S.: Transfer of cell sodium and potassium in experimental and clinical conditions. *J. Clin. Invest.* 27:74, 1948.
251. WINKLER, A. W., and SMITH, P. K.: Renal excretion of potassium salts. *Am. J. Physiol.* 138:94, 1942.
252. HOWARD, J. E.: The role of potassium in medical therapy. *Conn. Med. J.* 14:596, 1950.
253. DANOWSKI, T. S., PETERS, J. H., QUASHNOCK, J. M., and GREENMAN, L.: Studies in diabetic acidosis and coma, with particular emphasis on the retention of administered potassium. *J. Clin. Invest.* 28:1, 1949.
254. MOORE, F. D.: Adaptation of supportive treatment to needs of the surgical patient. *J. A. M. A.* 141:646, 1949.
255. FENN, W. O.: The role of potassium in physiological processes. *Phys. Rev.* 20:377, 1940.
256. ELKINTON, J. R., and WINKLER, A. W.: Transfer of intracellular potassium in experimental dehydration. *J. Clin. Invest.* 23:93, 1944.
257. RANDALL, H. T., HABIF, D. V., LOCKWOOD, J. S., and WERNER, S. C.: Potassium deficiency in surgical patients. *Surg.* 26:341, 1949.
258. GASS, H., CHERKASKY, M., and SAVITSKY, N.: Potassium and periodic paralysis. A metabolic study and physiological considerations. *Medicine* 27:105, 1948.
259. MERRILL, J. P., LEVINE, W. D., SOMERVILLE, W., and SMITH, S. 3rd: Clinical recognition and treatment of acute potassium intoxication. *Am. Int. Med.* 33:797, 1950.
260. FINCH, C. A., SAWYER, C. G., and GLYN, J. M.: Clinical syndrome of potassium intoxication. *Am. J. Med.* 1:337, 1946.
261. MC NAUGHTON, R. A., and BURCHELL, H. B.: Paralysis with potassium intoxication in renal insufficiency. *J. A. M. A.* 195:481, 1951.
262. WINKLER, A. W., HOFF, H. E., and SMITH, P. K.: Electrocardiographic changes and concentration of potassium in serum following injection of potassium chloride. *Am. J. Physiol.* 124:478, 1938.
263. TARAIL, R.: Relationship of abnormalities in concentration of serum potassium to electrocardiographic disturbances. *Am. J. Med.* 5:828, 1948.
265. SHOHL, A. R.: *Mineral Metabolism*. Reinhold Publ. Co., New York. p. 35 and 121, 1939.
266. WURTZ'S *Chem. Dic.*
267. ANDRE, A.: *J. Chem. Physiology* 15:242, 1925.
268. HENRIET, H.: Sur l'acide formique atmospherique. *C. R. Ac. Sc.* 136:-1465, 1903.
269. LOEW, W.: *Ber Dtsch. chem. Grs.* 46:687, 1913.
270. MILLER, S. L.: Production of amino acids under possible primitive earth conditions. *Science* 117:528, 1953.
271. MILLER, S. L.: *J. Am. Chem. Soc.* 77:2351, 1955.
272. ABELSON, P. H.: Amino acid formed in "primitive atmosphere." *Science* 124:935, 1956.



273. MILLER, S. L.: The mechanism of synthesis of amino acids by electric discharges. *Bioch. Biophys. Acta* 23:480, 1957.
274. MILLER, S. L.: The formation of organic compounds on the primitive earth. *Ann. N. Y. Acad. Sci.* 69:260, 1957.
275. GROTH, W., and WEYSSENHOFF, H. V.: Photochemical formation of amino acids from mixture of simple gases. *Naturwiss* 44:510, 1952. (Ch. Ab. 5140)
276. HEYNS, K., WALTER, W., and MEYER, J.: Experiments on the formation of organic compounds by electric discharges in atmospheres of simple gases. *Naturwiss* 44:385, 1957. (Ch. Ab. 52, 5140)
277. DOSE, K., and RAJEWSKY, B.: Strahlenchemische Bildung von Aminen und Aminocarbonsauren. *Bioch. Biophys. Acta* 25:225, 1957.
278. OPARIN, J.: *Origin of Life*. Acad. Press, 1958.
279. PAVLOSKAYA, T. E., and PASSYNSKY, A. G.: Amino acid formation when exposing formaldehyde and ammonium salt solutions to ultraviolet irradiations. IV Cong. Int. Bioch. 12, Vienna, 1958.
280. GARRISON, N. M., MORRISON, D. C., HAMILTON, J. G., BRUSON, A. A., and CALVIN, M.: Reduction of carbon dioxide in aqueous solution by ionizing radiations. *Science* 114:416, 1951.
281. MILLER, S. L., and UREY, N. C.: Organic compound synthesis on the primitive earth. *Science* 130:245, 1959.
282. GROTH, N., and WEYSSENHOFF, H. V.: Photochemische Bildung organischer Verbindungen aus Mischungen einfacher Gase.
283. HASSELFROM, T., HENRY, M. C., and MURR, B.: Synthesis of amino acids by I-radiation. *Science* 125:350, 1957.
284. PASCHKE, R., CHANG, R., and YOUNG, D.: Probable role of gamma irradiation in the origin of life. *Science* 125:881, 1957.
285. FOX, S. W.: Origin of life. *Science* 130:1622, 1959.
286. FOX, S. N., HARADA, K., and VEGOTSKY, A.: Thermal polymerization of amino acids and a theory of biochemical origins. *Experimentia* 15:81, 1959.
287. GRUNDLAND, L.: Origines de la vie. *Experimentia* 15:239, 1959.
289. HART, R. G., and SMITH, J. D.: Interactions of ribonucleotide polymers with tobacco mosaic virus protein to form virus-like particles. *Nature* 178:739, 1956.
289. FRAENKEL-CONRAT, H.: The role of nucleic acid in the reconstitution of active tobacco mosaic virus. *J. Amer. Chem. Soc.* 78:882, 1956.
- GIERER, A.: Structure and biological function of ribonucleic acid from tobacco mosaic virus. *Nature* 179:297, 1957.
- GIERER, A., and SCHRAMM, G.: Infectivity of ribonucleic acid from tobacco mosaic virus. *Nature* 177:702, 1956.
- GINOZA, W., and NORMAN, A.: Radiosensitive molecular weight of tobacco mosaic virus nucleic acid. *Nature* 179:52, 1957.
- ANONYMOUS: Viruses made to order. *Brit. Med. J.* No. 5015:390, 1957.
290. ARMITAGE, P., and DOLL, R.: The age distribution of cancer and a multi-stage theory of carcinogenesis. *Brit. J. Cancer* 8:1, 1954.
- ARMITAGE, P., and DOLL, R.: A two-stage theory of carcinogenesis in relation to the age distribution of human cancer. *Brit. J. Cancer* 11:161, 1957.

291. BEDGER, G. M.: Chemical constitution and carcinogenic activity. *Advanc. Cancer Res.* 2:73, 1954.  
BARNES, A. D., and KROHN, P. L.: The estimation of the number of histocompatibility genes controlling the successful transplantation of normal skin in mice. *Proc. Roy. Soc. B.* 146:505, 1957.
293. BAWDEN, F. C., and PIRIE, N. W.: Physiology of virus diseases. *Ann. Rev. Pl. Physiol.* 3:171, 1952.  
ECKERT, E. A., SHARP, D. G., BEARD, D., and BEARD, J. W.: Variation in infectivity and virus-particle content. *J. Nat. Cancer Inst.* 13:533, 1952.  
BEARD, J. W., SHARP, D. G., and ECKERT, E. A.: Tumor viruses. *Advanc. Virus Res.* 3:149, 1955.
294. BENEDETTI, E. L., and BERNHARD, W.: Presence de particules d'aspect viral dans la rate d'embryons de poulets normaux. *C. R. Ac. Sc.* 244:2204, 1957.
295. BERENBLUM, I.: A speculative review: the probable nature of promoting action. *Cancer Res.* 14:471, 1954.  
BERENBLUM, I.: Circumstantial evidence pointing to differences between cancers in terms of etiologic factors. *Cancer Res.* 16:675, 1956.
296. BERRILL, N. J.: Malignancy in relation to organization and differentiation. *Physiol. Rev.* 23:101, 1943.
297. BROWNING, H.: The action of tumors on normal tissue. *Cancer Res.* 12:13, 1952.
298. CAIRNS, H. J. F., and WATSON, G. S.: Multiplicity reactivation of bacteriophages. *Nature* 177:131, 1956.
299. CARR, J. G.: The mode of multiplication of the Rous no. 1 sarcoma virus. *Proc. Roy. Soc. Edinb.* 65:66, 1953.
300. COMFORT, A.: *The Biology of Senescence*. London, 1954.
301. CRICK, F. H. C., and WATSON, J. D.: Structure of small viruses. *Nature* 177:473, 1956.
302. DALE, R. C.: Cellular adhesiveness in relation to the invasiveness of cancer. *Cancer Res.* 14:519, 1954.
303. FEDOTOV, M.: Russian work on chemical induction. *Nature* 158:367, 1949.
304. FORD, E. B.: Genetics and cancer. *Heredity* 3:251, 1949.
305. GARDNER, W. V.: Studies on steroid hormones in experimental cancer. *Rec. Progr. Hormone Res.* 1:217, 1947.
306. GREENSTEIN, J. P.: *Biochemistry of Cancer*. New York, 1954.
307. HAUSCHKA, T. S.: Immunologic aspects of cancer: a review. *Cancer Res.* 12:615, 1952.
308. KALISS, N., and MOLOMUT, N.: The effect of prior injections of tissue antisera. *Cancer Res.* 12:110, 1952.
309. LEVAN, A.: Chromosomes in cancer tissue. *Ann. N. Y. Acad. Sci.* 63:774, 1956.
310. LURIA, S. E.: Mechanism of bacteriophage reproduction. *Fed. Proc.* 10:582, 1951.

311. MENKIN, V.: Biology of inflammation. *Science* 123:527, 1956.  
       MENKIN, V.: Studies on the possible induction of precancerous lesions by a fraction derived from inflammatory exudates. *Proc. Amer. Assn. Cancer Res.* 2:2, 1956.  
       MENKIN, V.: *Biological Mechanisms in Inflammation*. Thomas, Springfield, Chapt. 8, 1956.  
       MENKIN, V.: Growth-promoting factor of exudates and pre-neoplastic responses. *Proc. Amer. Assn. Cancer Res.* 2:3, 1957.
312. RUBIN, H.: Quantitative relations between causative virus and cell in the Rous no. 1 chicken sarcoma. *Virology* 1:445, 1955.  
       RUBIN, H.: Immunological relationships between virus and cell in the Rous sarcoma. *Ann. N. Y. Acad. Sci.* 69:4, 1957.
313. STACEY, M.: Chemistry of the gram-staining process. *Nature* 176:1145, 1955.
314. TANNENBAUM, A.: The dependence of tumor formation on the degree of caloric restriction. *Cancer Res.* 5:609, 1945.
315. SOUTHAM, C. M., MOORE, A. E., and RHOADS, C. P.: Homotransplantation of human cell-lines. *Science* 125:158, 1957.
316. DOMAGK, G.: Histologische Veranderungen an experimentellen und menschlichen Tumoren nach Darreichung von Zytostatika. *Deut. Med. Woch.* 21:81, 1956.
317. HALBERG, F.: Some physiological and chemical aspects of 24 hrs. periodicity. *Lancet* 73:20, 1953.
318. WERTLAKE, P. T., WILCOX, A. A., HALEY, M. I., and PETERSON, J. E.: Variation on serum lipids during mental and emotional stress. *Am. Heart Assoc. Mtng.* Oct., 1958.
319. AYLWARD, F.: Excretion of cholesterol. *Lancet*. October, 1958.
320. KINSELL, L. W., MICHAEL, G. D., FRISKEY, R. W., and SPLITTER, S.: Essential fatty acids, lipid metabolism and atherosclerosis. *Lancet*. Feb., 1958.
321. MOLMROS, H., and WIGAND, G.: Atherosclerosis and deficiency of essential fatty acids. *Lancet*. Nov. 7, 1959.
322. AHRENS, E. H., INSULL, W., HIRSCH, J., STOFFEL, W., PETERSON, M., FARQUHAR, J., MILLER, T., and THOMASSON, H.: The effect on human serum lipids of a dietary fat, highly unsaturated but poor in essential fatty acids. *Lancet*. Jan. 17, 1959.
323. NOTHMAN, M., and PROGER, S.: On the effect of arachidonic acid on serum lipids in man. *Fed. Proc.* 19:Part 1, 1960.
324. RAVICH, A., and RAVICH, A. R.: Prophylaxis of cancer of the prostate, penis, and cervix by circumcision. *N. Y. State J. of Med.* 51:1519, 1951.  
       RAVICH, A.: *J. Urol.* 48:298, 1942.
325. BARON, E., and ANGRIST, A.: *Arch. Path.* 32:787, 1941.
326. REVICI, E.: The role of biological imbalances in physiopathology and therapy. *Rev. Med. Pasteur*, 15:133, 1942.
327. GOLDMAN, L. B.: Use of lipids to enhance the effect of roentgen therapy in the treatment of pain from advanced cancer. *Presented before Amer. Medical Association, Section of Radiology, Atlantic City*, June 14, 1951.

## INDEX

### ABNORMAL amino acids, 41, 170, 155

- fatty acids, 132
- — — and conjugation, 129, 133, 238, 679, 695
- — — — method of investigation, 134, 622, 626, 627
- — — — pharmacology, 319
- — — — and radiation sickness, 319
- — — — and rancidity, 128, 133
- — — — and shock, 227, 229, 319
- — — — treatment of cancer with, 501
- Abnormal fixation, 60, 230, 312, 710
- growth in cancer, 40
- Acceptance of transplants, 209
- Accumulation of fluid and heptanol, 383, 721

Acetic acid, 121

Acetylsalicylic acid, 604

Acid-base balance, blood, 555

- patterns in burns, 50, 426
- in dyspnea, 61, 79
- in impaired hearing, 61, 75, 431
- in itching, 61, 64, 435
- in manic depressive states, 61
- in pain, 46, 421, 532, 561
- in trauma, 50, 426
- in urine, 90
- in vertigo, 67, 428
- in wounds, 50

Acid-base tissue abnormality, 55, 420

Acidifying agents, 52, 64, 69, 75, 80

Acid hydrolytic fraction, 192

Acid lipidic fractions, 317

- — — in cancer therapy, 468
- — — and pain, 422
- — — and S.d.c. pH, 601
- — — of tubercle bacilli, 193, 205, 208
- — — in tumor transplants, 653, 716
- Acid and alkaline patterns of dyspnea, 79
- — — in impaired hearing, 75, 431
- — — in itching, 61, 64, 435
- — — in pain, 47, 421, 561
- — — in tumors, 101
- — — symptoms, 46, 61, 79, 102, 420
- — — in vertigo, 69, 428

### Acrolein, 330

ACTH and allopregnanone, 633

— and potassium, 398

Actinium series, 106

Active cellular growth and potassium, 396

— lesion in hearing impairment, 431

Acute mastitis, form of cancer, 215

Acute shock, see Shock

Adaptation, 221

Adenomatous character of tumors, 716

— prostate and zinc, 401

Adipous cells and lipids, 160

— and sulfur mustard, 346, 347, 645

Adrenalectomy and abnormal fatty acids, 319

— and defense, 640

— and magnesium salt, 712

— and oxalic index, 248

— and radiation, 257

— and sodium chloride, 712

Adrenalin in shock, 234

Adrenals and arachidonic acid, 316, 373

— defense index, 325, 368, 374, 638

— fatty acids and unsaponifiable fractions, 371

— in liver regeneration, 162, 658

— and lymphatic system, 309

— and magnesium, 355

— and psychic states, 309

— and radiation, 257

Advanced cancer and shock, 420

Affinity of antigens, 189

— of diphtheria toxin, 199

Agents, antihemorrhagic, 441

— hemorrhagiparous, 439

— in therapy, 416, 533

Agglutination, 179, 190, 673

Aggregates and antibodies, 179

Aging and lipids, 82, 150, 452, 454

— and mercaptans, 330, 332

— and tetrahymena, 656

Agitation, 76

Akaton fat, 700

Alcohols, 121, 375, 390, 424, 426, 441,

458, 493, 533, 601, 680, 718,

719, 720, 721, 723, 725



- Alcohols and blood clot retractibility, 384  
 Aliphatic chain flexibility, 137, 633  
 Alkaline amino acids, 546  
 — — — and eosinophiles, 569  
 — — — in organization, 21  
 — hydrolytic fraction, 192  
 Alkaline pattern and trauma, 423  
 — — wounds, 50, 423, 597  
 Alkalizing agents, 53  
 Alkaloids, 604  
 Alkylating agents, 345  
 Allergy, 180, 193, 195, 210, 215, 267, 673  
 Allergic antibodies in defense, 191  
 — — and cancer, 215  
 — conditions, 451  
 — defense, 180, 215  
 — incubation, 180  
 — precipitates, 193  
 — reaction as test in cancer, 267  
 — 7th day manifestations, 210, 725  
 — skin, 673  
 Allopregnane, 144  
 — and arachidonic acid, 631  
 Allotropic resonance forms, 302  
 Allyl alcohol, 389  
 — K xanthate, quenching effect, 709  
 — mercaptan, 332  
 Alpha hydroxy fatty acids, 639, 710  
 — — — and microbes, 375  
 — — — and tumors, 326, 509, 710  
 Alpha-thio fatty acids, 338  
 Alpha tocopherol, 410  
 Alternate oxidation of fatty acids, 131  
 Alternate polarity, 272  
 — — in fatty acids, 131, 627  
 — — and twin formation, 270, 627  
 Aluminum, 403  
 Amino acids, 41, 155, 169, 391, 549, 551  
 — — dextrorotatory, 551  
 Aminofluorene, 274  
 Aminophyllin, 604  
 4-aminostilbene derivatives, 275  
 Amino sugars, 145, 435, 438, 638  
 Ammonioselic, 596  
 Ammonium, 107, 395, 398  
 — chloride, 54, 403  
 — molybdate, 399  
 — monophosphate, 434  
 — and S.d.c. pH, 600  
 Amylase, 172  
 n-Amyl alcohol, 122  
 Amyl mercaptan, 332  
 Anabolic processes and oxygen, 407  
 Analyses, see specific substances and conditions  
 — see fatty acids  
 Analytical dualism, 86  
 — patterns, 90  
 Anaphylatic shock, 181  
 Androsterone, 141  
 Anesthetics, index of repartition, 125  
 Angina pain and procaine, 392  
 Animals, place in organization, 30  
 Anions in S.d.c. pH, 599  
 Anoxybiosis, 95  
 Antagonism agents, see pharmacodynamic activity  
 — between elements, 104-107  
 — — fatty acids—antifatty acids, 148-165, 362  
 — — positive and negative lipoids, 362  
 — — patterns, 43-99  
 Anthrax, 197  
 Anti-acid role of eosinophiles, 567, 570  
 Anti-anemic liver extract, 604  
 Antibiotics of fungal origin, 604  
 Antibodies, allergic, 179  
 — in cancer, 212, 218  
 — in infectious diseases, 195  
 — lipido-proteic, 181  
 — neutralizing proteic, 182  
 Anti-diphtheria serum, 199  
 Anti-fatty acids, 135, 148-165, 362  
 — — action of corticoids, 372  
 — — — of elements, 394  
 — — — of glycerol, 363  
 — — — of glycerophosphoric acid, 368  
 — — — of sterols, 369  
 — — and cardiac rhythm, 164  
 — — and complex organisms, 158  
 — — and convulsions, 163  
 — — and intestines kidney, 162  
 — — in microbes, 157  
 — — in oestral cycle, 164  
 — — in pain, 160  
 — — pharmacology, 362  
 — — in protozoa, 158  
 — — regeneration, 161  
 — — systemic patterns temperature, 165  
 — — and viruses, 154, 296  
 — — and wound healing, 161  
 Antigen antibody complex, 179  
 Antigens, affinity, 189  
 Antihemorrhagic agents, 441, 448  
 Antiheterogeneous reaction, 177, 188  
 Antioxidants, 409  
 Antipneumococcic immune sera, 198  
 Antipyretics, 604  
 Antirabies serum, 203  
 Antithrombocytic agent, 355  
 Antitryptic power in serum, 674  
 Antityphoid serum, 201

- Anuria, 427  
 Arachidonic acid and adrenals, 316, 373  
   — and allopregnane, 631  
   — and blood red cells, 316  
   — and corticoids, 139  
   — as essential fatty acid, 621  
   — and quenching of fluorescence, 697  
   — and S.d.c. pH, 601  
   — and smallpox virus, 316  
   — and sterols, 316, 631  
 Arginine, 169  
   — and eosinophiles, 569  
   — in organization, 18  
 Arneth's formula and lipids, 668  
 Arsenic and bac. anthracis, 402  
   — as carcinogen, 300  
   — cocarcinogen, 403  
 Arteriosclerosis, 452  
   — and alcohols, 458  
   — atheroma, 454  
   — cholesterol, 453, 669  
   — and organization, 452  
   — therapeutic attempts, 457  
 Arthritis, 435  
 Ascites tumors, see specific agents  
   — and epichlorohydrin, 348  
   — and lysis, 691  
   — and role of lipids, 694  
 Ascorbic acid, 145, 604  
 Aspartic acid, 169  
 Atheromas, 454  
   — and sodium, 395  
 Atom, electrostatic forces, 5  
   — in organization, 3  
   — quantum forces, 4  
 Atonic wounds and oxygen, 406  
 Atropine, 604  
 Autolysis of organs and glycerol, 364  
 Autolysis of placenta, 462  
 Automatism in heart cells, 660  
   — and lipids, 661  
  
 Bac. anthracis and arsenic, 402  
   — and lipids, 157, 369  
 Bacteriophages, see phages  
 Bacteriostatic effect of glycerol, 364  
 Barbiturates, 604  
 Barium, 105, 361, 600  
 Barometric influences, 653  
 Basophiles, heparin, 569  
 Basophilic cytoplasm, 82  
 Benzanthracene and quenching of fluorescence, 696  
 Benzedrine, 604  
 Benzene resonance forms, 8  
 Benzpyrene, 696  
 Berry-Dietrich phenomenon, 294  
 Beryllium, 354  
 Beta globulins, 181  
 Beta mercaptopropionic acid, 339  
 Beta oxidation, 128, 131, 616, 618  
   — in rancidity, 128  
 Beta radiation, 241  
 Bicarbonate ion and S.d.c. pH, 600  
 Biological factors and S.d.c. pH, 608  
   — properties of lipids, 125  
   — realm, 17  
   — boundary formation, 23  
 Biologically guided chemotherapy, 526  
   radiotherapy, 262  
   therapy, 414  
 Bismuth, 105, 402, 600  
 Bivalent negative selenium, 342  
   — sulfur, 340  
 Bixine, 205  
   — and connective cells, 324  
   — and convulsions, 324  
   — and lipid distribution, 694  
   — and treatment, 473, 534  
   — and tumors, 325  
 Blood acid-base balance, 46, 555  
   analyses, 317  
   butanol mixture, 449  
   C reactive proteins, 86  
   chlorides, 532  
   cholesterol, 358, 452  
   clot retractibility, 384  
   diabetic changes, 86  
   elements, 107, 351, 394  
   eosinophiles, see eosinophiles  
   leucocytes, 86, 532, 668  
   lipids, 662, 667  
   — in shock, 667  
   pH, 46, 555  
   potassium, 49, 86, 532, 571  
   as proper level, 350  
   red cells, see red cells  
   and urinary pH, 46, 555  
 Bloor's definition of lipids, 114  
 Body acid base balance, 46  
 Bohr's theory, 3  
 Bonds of chloride ions, 403, 622  
   — glucuronic and sulfuric acid, 641, 643  
 Bone fractures and molybdenum, 399  
 Borderline substances, 119  
 Boric acid, 105  
 Boron, 403  
 Botulism, 197  
 Bond to fatty acids: chlorides, 143, 403, 622  
   — glycerol, 135, 364  
   — glycerophosphoric acid, 137, 368

- Bond to fatty acids, unsaponifiable fractions, 371  
 — — — — sterols, 136, 369  
 Boundary formations, 126  
 — — in biological realm, 23  
 Bradycardia, 83, 166  
 Brain and sterols, 369  
 Breast carcinoma, inflammatory form, 215  
 Broad scale viruses, 292  
 Bromine, 104  
 Broth injections, pleural, 174  
 Brucellosis and copper, 359  
 "Bulkhead's disease," 551  
 Bullet wounds and shock, 226  
 Burns and acid-base balance, 50  
 — anuria, 427  
 — butanol-sodium lactate, 380, 427, 720, 723  
 — radiation, 252, 427  
 Butanedine, 622  
 Butanol and anuria, 427  
 — and arteriosclerosis, 458  
 — and burns, 426  
 — in cancer therapy, 493  
 — glycerophosphoric acid, 380  
 — and growth, 379  
 — and hemorrhage, 441  
 — and induced wounds, 379  
 — and itching, 432  
 — and leucocytes, 379, 719  
 — mixed with blood, 449  
 — narcotizing dose, 719  
 — and pain, 380, 422, 723  
 — and plastic surgery, 443, 725  
 — in postoperative care, 422, 426, 723  
 — quenching effect of, 709  
 — and radiation burns, 380  
 — and schizophrenia, 718  
 — S.d.c. pH, 602  
 — and shock, 234, 380  
 — sodium benzoate, 720  
 — sodium lactate, 380, 427, 720, 723  
 — subnarcotizing dose, 719  
 — therapy, 721, 722  
 — toxicity, 378, 718  
 — in trauma, 424, 723  
 — tumors, 493  
 — and tumors chlorides, 710  
 Butter, unsaponifiable fractions, 37  
 Butyl alcohols, see butanol  
 Butylamide, 123  
 Butylketone, 123  
 Butyl-mercaptan, 332, 709  
 Butyric acid, 121  
 CACODYLATE ion and S.d.c. pH, 600  
 Caffeine, 604  
 Calciferol and calcium, 358  
 Calcium in blood, 86  
 — and calciferol, 358  
 — and cancer, 356, 361, 395  
 — and carcinogens, 357  
 — and cellular membrane, 126  
 — chloride, 403  
 — and copper, 359  
 — and dualism, 86, 102  
 — elements, 356  
 — excretion of, 166, 595  
 — and fatty acids, 126, 358  
 — and grass tetany, 355  
 — index, 575, 595  
 — induced changes, 357  
 — and liver cell regeneration, 356  
 — and patterns, 85  
 — and phosphorus, 359  
 — retention, 166, 359, 575, 595  
 — and S.d.c. pH, 357, 600  
 — and testosterone, 358  
 — and zinc, 401  
 Caloric metabolism of fatty acids, 129, 135, 363  
 — — role of glycerol, 363  
 Cancer, see also cancerous  
 — see also tumors  
 — abnormal growth in, 40  
 — allergic reaction as test in, 267  
 — allotropic resonance forms, 302  
 — and calcium, 357, 359  
 — and carbamic acid, 307  
 — of the cervix and circumcision, 305  
 — and chloride content, 312, 710, 716  
 — circulating cells, 266  
 — and copper, 111, 360  
 — diagnostic tests, 265  
 — and divorce, 308  
 — dualism in physiopathology of, 99  
 — evaluation of results, 417  
 — and emotional relationship, 308, 309  
 — and fatty acids, 312, 323, 326, 466, 473, 501, 533, 703, 710, 715  
 — see also fatty acids  
 — and genetics, 302, 307  
 — as hierarchic condition, 38, 268  
 — immunological problems, 212-220  
 — induction, see carcinogenesis  
 — in situ, 39, 40, 305, 550  
 — invasive phase, 40, 305  
 — and lipids, see specific lipids  
 — and lipoids, see specific lipoids  
 — and magnesium, 355  
 — and marital status, 308  
 — and mercaptan, 332, 477  
 — non-invasive phase, 39

- Cancer as organized condition, 38
  - painful phase, 40
  - pathogenesis, 264
  - physiopathology dualism, 99
  - plurality of phases, 38, 40, 264
  - and potassium, 396
  - preterminal phase, 40
  - of prostate and circumcision, 305
  - of prostate and zinc, 401
  - psychological factors, 308, 310
  - radiation, 261, 262, 524, 683, 726
  - and smegma, 305
  - and sterols, 148, 168, 369-373, 466, 715
  - and sulfur, see specific agents
  - terminal phase of, 41
  - therapeutic approach to, see cancer therapy
  - and unsaponifiable fractions, 306, 372, 468
  - and urethane, 689
  - viruses, 290-301
  - and widows, 308
- Cancer therapy, acid lipidic fraction, 468, 533
  - butanol, 493, 533
  - chemotherapy, 463, 542
  - cod liver oil fatty acids, 533
  - conduct of treatment, 536
  - conjugated fatty acids, 501
  - criteria used, 532
  - glycerol, 493, 533
  - group of agents in, 473
  - guided therapy, 461, 463, 526, 547
  - guided level chemotherapy, 526
  - mercaptans, 477
  - placenta extracts, 463
  - present form, 531
  - radiation, 261, 524, 683, 726
  - radiotherapy, 524
  - results, 463, 526, 537
  - selenium, 512, 518, 533
  - sterols, 466
  - sulfurized oil, 481
  - tetraline perselenide, 518, 533
  - — persulfides, 491, 533
  - thiosulfates, 482, 533
  - unsaponifiable fractions, 468, 533
- Cancerous amino acids, 307
  - cells, 40, 303
  - chromosomes, 39, 41, 303
  - entities as ontogenic allotropy, 303
  - hierarchic entities, 41, 303
- Capillary hemorrhage in shock, 228
- Capric acid, 121, 639
- Caproic acid, 121, 639
- Caprylic acid, 121, 639
- Carbamic acid, 170, 307
- Carbon, 108, 334
- Carbonate ions in shock, 230
- Carbonium ion, 279
- Carboxyl, resonance forms, 8
- Carcinogenesis, allotropic resonance, 302
  - and arsenic, 403
  - and copper, 360
  - and croton oil, 690
  - energetic factors, 270
  - epoxides, 281
  - experimental, 268, 307
  - and genetics, 302
  - and host, 295
  - and lipids, 304
  - and lipoids, 296
  - and nitrogen mustard, 278
  - and synjugate formations, 283
  - twin formations, 271
  - unsaponifiable fractions, 690
  - and urethane, 307
  - and virus, 290, 301
- Carcinogenic hydrocarbons, fluorescence, 695
- Carcinogens, see specific substances
  - and calcium, 357
  - and energetic spectrum, 288
  - and fatty acids, 705, 708
  - monstrosities and mutations, 268
- Cardiac rhythm and glycerol, 366
  - and lipids, 169, 714
  - and lipoids, 661, 714
- Catabolic phase of wounds, 161
- Catalases, 111, 360, 409
- Cations, see elements
  - of different compartment, 27
  - and organization, 27
  - in S.d.c. pH, 599
- Cells, place in organization, 23
  - cancerous, 40, 303, 305
  - in prostate, 305
  - rapid aging, 82
- Cellular adhesiveness and calcium, 357
  - basophil cytoplasm, 82
  - membranes, 127
  - oxidation, 166
  - vacuolation in shock, 228
  - youth, prolonged, 102
- Cellulose gum, 715
- Cenapse, lipids, 622
- Ceruloplasmin and ammonium molybdate, 399
  - and copper, 359
- Cervix cancer in Jewish women, 305
- Chain, rigidity, 137
- Character of tumors, adenocarcinomatous, 716

- Character of tumors, hemangiomatus, 653  
 — — — sarcomatoid, 716  
 — — — ulcerated, 653  
 Charcot-Leyden crystals, 567  
 Chemical factors and S.d.c. pH, 601  
 Chemical shock and oxalic index, 248  
 Chemotherapy and radiotherapy, 726  
 Chickenpox, 197, 295, 296, 312, 313, 654, 655  
 Chill, 175, 226, 427  
 — and defense, 185  
 — and glycerol, 366, 713  
 China wood oil fatty acid, see eleostearic  
 Chlorbutanol, 404  
 Chlorides, bound to fatty acids, 134, 622  
 — content of lesions, 102, 166  
 — — and lipids, 710  
 — — of tumors, 312, 710  
 — — of wounds, 210  
 — excretion, 166  
 — and gastric ulcerations, 403  
 — index, 595  
 — irreversible fixation, 134, 622  
 — and liver damage, 404  
 — retention, 166, 254, 419  
 — and S.d.c. pH, 600  
 — and shock, 231, 396, 404, 419  
 — in urine, 86, 166, 532, 595  
 Chlorine, 105, 403  
 — treatment of fatty acid, 700  
 Chloroform, 604  
 Chloropropanediol, 348  
 1 Cholanthrene-3 Methyl, 696  
 Cholera, 197  
 Cholesterol as anti-fatty acid, 142  
 — and arteriosclerosis, 453  
 — and experimental tumors, 370  
 — and foot ulcerations, 371  
 — and glycerol, 365  
 — and ischemic infarct, 370  
 — and Kuppfer cells, 456  
 — and manifestations, 370, 715  
 — and microbes, 369  
 — and old age, 646  
 — paraplegia induced by, 644  
 — pharmacology, 369  
 — precipitation, 453, 669  
 — quenching effect, 709  
 — and RES, 456  
 — from scalene, 631  
 — and viruses, 297  
 Choline, 368  
 Chromatography, gas, fatty acids, 627  
 — unsaponifiable fractions, 373  
 Chromium, 399  
 Chromomeres, place in organization, 17  
 Chromonemata, place in organization, 17, 18  
 Chromosomes in cancer, 550  
 — place in organization, 17, 18  
 Chylomicrons, 135  
 Circulating cancer cells, 267  
 Circulation of fatty acids, 135  
 Circumcision and cancer of the cervix, 305  
 — and prostatic cancer, 305  
 Citraconic acid, 410  
 Citric acid and S.d.c. pH, 600  
 Clinical manifestations in defense, 185  
 Clonic convulsions in shock, 226  
 Clot retraction, 172  
 — — and alcohols, 384, 444  
 — — in hemoglobinuria a frigore, 674  
 Clupanodonic acids, 317  
 C-N-C-N 21, 545  
 — and urethane, 689  
 CO as polar group, 120  
 Co<sub>2</sub> combining power, blood, 46, 555  
 C reactive protein, 86, 102  
 Coagulability, blood, 172  
 Coagulant antibodies, 179  
 Coagulation time in hemoglobinuria a frigore, 674  
 Cobalt and S.d.c. pH, 600  
 Co-carcinogens, 270, 307, 689  
 Cod liver oil fatty acids  
 — — — — and cancer therapy, 466  
 — — — — and carcinogens, 703  
 — — — — and chlorides, 710  
 — — — — quenching effect, 707, 709  
 — — — — sedimentation red cells, 664  
 — — — — and shock, 667  
 — — lipo-alcohols, 388  
 Cohesion forces, 114, 378  
 Colds in children, 655  
 Coli bacilli infection, 721  
 Colloidal silver-protein, 174, 670  
 — sulfur, 334  
 — suspensions, 656, 715  
 Colloids, urinary surface tension, 590, 648  
 Colon and lipids, 162  
 Color index, red cells, 102  
 Colorimetric oxidoreduction pot. in urine, 590  
 Coma and lipids, 163, 659  
 Community, 548  
 Compartments, organization, 27  
 Condensation of electrons in carcinogens, 270  
 Conduct of treatment in cancer, 535  
 Conglutinated red cells, 179

- Conjugated fatty acids and ascites cells, 322
  - in cancer therapy, 501
  - and carcinogenesis, 703
  - and carcinogens, 705
  - from cod liver oil, 335
  - and convulsions, 324
  - and fixation of chlorides, 135
  - and liver regeneration, 323
  - and lymphatic system, 323
  - and manifestations, 322
  - and neoglucogenic corticoids, 362
  - and oxygen, 701
  - pharmacology, 319
  - and quenching of fluorescence, 699
  - and S.d.c. pH, 323
  - and shock, 227
  - transport of, 694
  - treatments of, 701, 702
  - and tumors, 322
  - and viruses, 322
  - formations, 135, 622
  - isomers, see conjugated fatty acids
  - linoleic acid, 335, 639, 708
  - pentaenics, 701
  - polyenes, 283
  - tetraenics, 700
  - trienes and adrenal defense index, 695
  - and radiation, 238, 248
  - and trauma, 375
  - trienic alcohols, 718
- Conjugation methods, 129, 133, 238, 679, 695
- Connective tissue, amount of, 102
  - and bixine, 324
  - conditions, 437
  - and glucosamine, 145, 438, 646
  - healing, 161
  - and radiation, 256
- Constancy and organization, 33
- Constants of the entity, 171
  - role in organization, 28
- Constipation, 83, 102, 166
- Constituents, 104, 222
- Constitution, crust of the earth, 108
  - of viruses, 690
- Constitutional role of fatty acids, 130
- Convulsions and cholesterol, 370, 715
  - and coramine, 448
  - and deoxycorticosterone, 367, 659
  - and ethylmercaptan, 332
  - and fatty acids, see specific agents
  - and glucose, 368
  - and glycerol, 366, 714
  - hemorrhagiparous agents, 448
- Convulsions and heptonal, 383
  - and lipid, 163, 370, 659, 715
  - and magnesium, 355
  - and octanediol, 387
  - and steroid, 448
  - induced by thiamine, 313-317, 324, 356, 448
- Copper, 358-360
  - and calcium, 356
  - and cancer, 111, 360
  - distribution, 109, 111
  - in liver cells, 111
  - in periodic chart, 105
  - and S.d.c. pH, 600
- Coramine and hemorrhage, 440
- Coronary occlusion, 370, 459
  - thrombosis and magnesium, 355
- Corpuscles, subnuclear, 543
- Corticoids, 144, 355, 367, 373, 383, 635, 637
  - and aminosugars, 145, 437, 639
  - and arachidonic acid, 139, 143, 631
  - coma, 163, 659
  - convulsions, 163, 387, 659
  - and defense, 640
  - and eosinophiles, 569
- Corticosterone, 365
- Cortisone, 145, 435, 438, 636, 637, 638, 640
- Cottonseed oil lipoalcohols, 388
- Crisis in pneumonia, 198
- Criteria for treatment, 415, 532
- Critical oxalic acid index, 227
- Croton oil and carcinogenesis, 690
- Crotonic aldehyde, 330
- Crotyl alcohol, 389
- Crust of the earth, constitution, 108
- Cyclization of arachidonic acid, 139, 143, 631
  - of squalene, 139
- Cyclopentane forces, 139
  - group and twin formations, 273
- Cyclopentanophenanthrene, origin of, 631
- Cysteine, 340
- Cytochrome oxidase, 399
  - and copper, 359, 360
- Cytological dualism, 82
- Cytolytic activity, 691-694
- Cytoplasm in cancer, 40, 550
- Cytoplasmic virus, 292
- DARK color of blood, 678
- Dead virus vaccine, 219
- Deafness, see Impaired Hearing
- Death in coma, or conscious, 102
  - and organization, 32
  - in shock, 226

- Decarboxylation, 633  
 Decyl alcohol, 602  
 Defense, 171-224, 312, 639  
   — adrenal index, see adrenal  
   — and allergic reaction, 180  
   — antibodies, 180, 181, 182  
   — antigens, 189  
   — antiheterogenous reaction, 177  
   — and cancer, 212  
   — at cellular level, 206  
   — role of corticoids, 640  
   — diphasic phenomenon, 172  
   — and dualism, 223  
   — fatty acids, 639  
   — and grafts, 214  
   — and hetero- and homotropy, 224  
   — and hierarchic levels, 184  
   — and infectious disease, 195  
   — and lipids, 176  
   — noxious agents, 171  
   — oscillatory movement, 223  
   — prolonged hemoshock, 176  
   — phylogenetic development, 222  
   — and reticuloendothelial system, 223  
   — tissues, 206  
   — and trauma, 640  
 Definition of lipids, 114  
 Degradated proteins, 172  
 Deoxycorticosterone convulsive seizures, 367, 659  
   — defense, 640  
   — and glycerol, 367  
   — and heptanol, 383  
   — as lipid, 637  
   — and S.d.c. pH, 604  
 Dermatotropic viruses, 299, 314  
 Desaturation of fatty acids, 129, 130  
   — in the liver, 619  
   — and radiation, 238  
 Desmolyse, 642  
 Destruction of thrombocytes, magnesium, 355  
 Destructive infection, 295  
 Detergents and cancer, 550  
 Detoxification, glucuronic acid, 643  
   — sulfuric acid, 641  
 Dewar structures, benzene, 8  
 Dextrorotatory amino acids, 170  
   — — — and cancer, 551  
 Diacid fatty acids, 618  
 Diagnosis of pain pattern, 364  
 Diagnostic tests in cancer, 265  
 Diarrhea, 83, 166  
 1,2,5,6 Dibenanthracene and quenching of fluorescence, 698  
 3:4:5:6 dibenzcarbazole, 273  
 9-, 10-dichlorostearic, 404  
 Dicumarol, 604  
 Di-epioxides, 278  
 Diethenoics, 315  
 Diethylaminoethanol, 393  
 Diethylcarbinol, 122  
 Diethylene-glycol, 387  
 Diethylstilbestrol, 140, 276  
 Differentiation of cells and cancer, 102, 291, 551  
 Digitaline, 604  
 9-, 10-diiodostearic acid, 405  
 Dimercapto-propanol, 333  
 Dimethanesulfoxonoxyalcanes, 278  
 Dimethylaminoazobenzene, 275  
 2:4 Dinotrophenyl-ethyleneimine, 280  
 Dinucleophily, 144  
 Diols, 387  
 Diphasic phenomenon, 172, 173  
   — — in hemoglobinuria a frigore, 674  
 Diphtheria, 187, 199  
 Dipolar lipidic boundaries, 126  
 Dipolarity of red cells in shock, 233  
 Dipositive polarity, 139  
 Direct action of radiation, 257  
   — transfusions and shock, 226  
 Discharge, electric, 545  
 Displacement of the double bond, 135, 622  
 Diuresis, 166  
   — and lipids, 162  
   — and mercury, 402  
 DNA in viruses, 690  
 Dodecyl mercaptan, 333  
 Double bonds, 131  
   — — changes, 619  
   — — conjugation, 132, 135, 695  
   — — fixation on, 622  
   — — position of, 618  
   — — and synjugation, 283  
 Dualism, 35, 43-103  
   — abnormal substances, 60  
   — acid-base balance, 45  
   — acidifying and alkalizing agents, 52  
   — in blood analyses, 86  
   — and cancer physiology, 99  
   — and cardiac rhythm, 164  
   — at cellular level, 82  
   — and chloride excretion, 61  
   — for coma and convulsion, 163  
   — in defense, 223  
   — in dyspnea, 77  
   — of elements, 105  
   — and eosinophiles, 86, 567  
   — of fatty acids and anti-fatty acids, 148  
   — of fundamental offbalances, 91  
   — in impaired hearing, 73  
   — for intestines, 162

- Dualism, in itching, 61, 64, 562
  - in kidney physiology, 162
  - for lipids and lipoids, 125
  - in manic depression, 75
  - in microbes, 175
  - in nature, 35
  - in nervous system, 162
  - at organic level, 83
  - oxydoreduct. pot. tissue, 59
  - — — urine, 86, 590
  - pain, 43, 45, 160, 552
  - and patterns, 45, 82
  - and potassium, 612
  - and regeneration, 161
  - and S.d.c. pH, 597
  - at systemic level, 83
  - for temperature, 83, 164
  - in tumors, 99
  - in urine analyses, 86, 90, 165, 557, 590
  - and viruses, 154
  - in vertigo, 67
  - and wheal resorption, 83, 566
- Duodenal fluid accumulation in shock, 228
- Dynamic balance, 172
- Dysentery, 197
- Dysoxybiosis, 95
- Dyspnea, 61, 77, 83, 102
  - as acid base patterns, 78, 79
- EDEMA and heptanol, 383
  - in shock, 228
  - and wheal resorption, 566
- Ehrlich ascites tumor, 322, 348, 691
- Ehrlich mammary tumor, 715
- Electric discharges, 545
- Electron, 544
  - transfer, 5
- Electronic configuration, elements, 106
- Electrophoretic analysis of antibodies, 181
- Electrostatic forces in atom, 5
  - in molecules, 6, 9
- Elements, 105, 112
  - anti-A, 105, 349-361
  - anti-D, 105, 394-404
  - in organization, 107
  - proper level, 350
- Eleostearic acid, 320, 335
  - — and carcinogens, 708
  - — defense against, 639
  - — and oxidation, 129
  - — and S.d.c. pH, 601
- Eleostearic alcohol, 388
- Embryos' unsaponifiable fractions, 371
- Emulsion, 124
- Encephaloid tumors, 372
- Endarterial obliterations, 370
- Endodermic formations, defense, 223
- Endothelial proliferation and radiation, 256
- Endotoxin, 197
- Energetic centers of nonpolar group, 131
  - — in steroids, 635
  - factors in carcinogenesis, 270
  - spectrum of carcinogens, 288
- Enophthalmia, 102, 226, 371
- Entities, 12
- Environmental influence, 649
  - — and surface tension, 651
- Enzymatic hydrolysis, 174
  - — of procaine, 393
  - Knoop beta oxidation, 129
- Eosinophiles, 86, 102, 166, 324, 532, 567-570
- Ephedrine, 391
- Epichlorohydrin, 345, 348, 422, 432
  - in cancer, 523, 533
- Epidemiology of poliomyelitis, 298
- Epileptic seizures, magnesium, 356
- Epinephrine, 391
- Epithelia healing, 161
- Epoxides, 409
  - carcinogens, 281
  - of fatty acids, 132, 327
- Erysipelas, 197, 204
- Erythralgia, 554
- Erythrocytes, see red cells
- Essential fatty acids, 132, 621
- Esterase, 172, 674
- Estradiol, 140
- Estrogenic properties, 140
- Ethyl alcohol in conjugation, 122
  - butyrate, 674
  - mercaptan, 330-333
  - — in therapy, 476
  - sulfate, quenching effect of, 709
- Ethylene trithiocarbamate, quenching effect, 709
- Ethyleneglycol, 387
- Ethylenimines, 280
- Ethylenimonium ion, 179
- Evaluation of projective personality, 308
  - of results in cancer therapy, 417
- Evening dyspnea, 77
- Excretion index, 86, 415, 594
  - of surface active substances, 166
- Exercise and blood changes, 671
- Exfoliative cytology, 40, 550
- Exophthalmia, 102, 370
- Exotoxin, 197
- Experimental carcinogenesis, see carcinogenesis
- Exploratory psychotherapy, 308



- Extracellular potassium, 547  
 Extrasystoles and lipoids, 661
- FADING response, 325  
 Fall and leukoses, 298  
 Family and organization, 548  
 Fate of transplants, 213  
 Fatty acids, abnormal, 132, 134, 227, 285, 319, 501, 695, 700  
 — of adrenal origin, 374, 452  
 — alpha hydroxy, 326, 375, 509, 639, 710  
 — alpha thiol, 338  
 — alternate polarity, 131, 627  
 — analyses, 130, 134, 227, 285, 622, 626, 627, 680, 695, 700  
 — and Arneith's formula, 668  
 — in arteriosclerosis, 456, 457  
 — bound to glycerol, 135, 362  
 — to glycerophosphoric acid, 136  
 — to sterols, 136, 137  
 — breakdown, 616  
 — and calcium, 126, 358  
 — as caloric metabolites, 128, 129, 130, 135  
 — and cancer, 323, 326, 466, 473, 501, 533, 703, 710, 715  
 — and chlorides, 135, 622  
 — and chlorine, 403, 700  
 — of cod liver oil, 285, 340, 450, 466, 533, 695, 700  
 — conjugated, 133, 227, 285, 501, 695, 700  
 — constitutional role, 130  
 — and cytolytic activity of sera, 694  
 — desaturation, 122, 129, 619  
 — diacid, 618  
 — and enophthalmia, 317  
 — epoxides, 132  
 — essential, 132, 621  
 — fission, 130, 134, 227, 238, 240, 243, 245, 248, 251, 253, 354, 616, 680, 682  
 — flexibility of the chain, 139, 633  
 — fractionation, 622, 627  
 — free, 134, 172, 622  
 — functional role, 130, 135, 365  
 — gas chromatography, 627  
 — heat, oxygen or sulfur treatment, 700  
 — and hemolysis, 663  
 — and hemorrhage, 450  
 — hydroperoxide of, 131  
 — hydrosulfides, 481, 711  
 — and immune antibodies, 192, 671  
 — intestinal absorption, 135  
 — leucopenia, 166, 316, 668
- Fatty acids, liver regeneration, 162, 658  
 — lytic activity, 364, 693  
 — melting point, 130  
 — organizational role, 135  
 — oxalic index, see fission  
 — oxidation, 129, 131, 133, 354, 616, 618  
 — and patterns, 148, 168  
 — pathogenic role, 135  
 — peroxides, 129, 132  
 — pharmacology, 312  
 — positive carbon, 131, 132  
 — and quenching of fluorescence, 697  
 — and radiation, 238, 248, 258, 322, 524  
 — rancidity, 128, 133, 410  
 — and red cells, 315, 322, 663, 664, 665, 666, 678  
 — role in membrane, 126  
 — saturated, 117, 128, 227, 312, 362, 601, 639  
 — semipolar center in, 131  
 — and serial treatment, 715  
 — and shock, 227-233, 625, 679  
 — and smallpox, 154, 155, 316, 322  
 — spectral analysis, 134, 626  
 — tetraenic, 697, 700  
 — and tetrahymena, 646, 656, 657  
 — transportation in blood, 694  
 — and tumors, see cancer  
 — unsaturated, 117, 130, 131, 148-165, 227, 313-317, 369, 422, 466, 473, 616, 626, 640, 646, 658, 663, 678, 679, 680, 695, 700, 703, 715  
 — and viruses, 154, 296, 316, 322
- Fatty infiltration in liver regeneration, 162, 658
- Female sex hormone, 139, 347, 603  
 — and cholesterol paraplegia, 371, 644
- Fenestration, 430
- Ferrous sulfate and sulfur mustard, 346
- Fever, 173, 175, 185, 399, 713  
 — in hemoshock, 172  
 — in infectious diseases, 195  
 — and sterols, 175
- Fiber cells, 551
- Fibroma virus in rabbits, 295
- Ficine, 444
- Fish oil, 698
- Fission of fatty acids, see fatty acids
- Fixation of chlorides on fatty acids, 135, 622
- Fixed positions of energetic centers, 137  
 — virus, 202

- Flexibility of fatty acid chain, 137  
 Flocculation, 179  
 Fluorine, 105, 404  
 Fluorescence, see quenching of  
 Foci, constitution and processes in, 60  
 Foot ulcerations and cholesterol, 371  
 Formic acid, 125, 545  
 Fractionation of fatty acids, 627  
 Fractures and acid-base balance, 50  
 Free lipids, 622  
 Functional role of fatty acids, 130, 135, 363  
 Fundamental offbalances, 93
- GALACTOSAMINE, 145  
 Galactose, 145  
 Gallbladder colic, 50, 432  
 Gamma globulins, 183  
 — radiation, 241  
 Gaseous gangrene, 197  
 Gastric ulcerations and chlorides, 403  
 Genes, place in organization, 26  
 Genetic factor in carcinogenesis, 302  
 Geriatry, see old age  
 Glioma virus, 295  
 Globulinic antibodies, 183  
 Glomerulonephritis in infection, 204  
 Glucagon and zinc, 401  
 Gluco group, 145  
 Gluconate ion and S.d.c. pH, 600  
 Gluconic acid, 170  
 Glucosamine in arthritis, 435  
 — and connective tissue, 438  
 — and iridocyclitis, 439  
 — synthesis, 145, 638  
 Glucosaminic acid, 638  
 Glucose and convulsions, 368  
 — and hemorrhage, 440  
 — oxidation abnormal, 132  
 — pH of tumors, 368  
 — and potassium, 398  
 — and S.d.c. pH, 368, 603  
 Glucosides, 604  
 Glucuronic acid, 132, 147, 170  
 — — coupling mechanism, 641  
 — — and sulfuric radicals, 642  
 — — in urine, 86  
 Glutathion, 341  
 Glutamic acid, 169  
 Glyceric acid and aldehyde, 368  
 Glycerol and arteriosclerosis, 458  
 — caloric metabolism, 363  
 — and cancer therapy, 493, 533  
 — cardiac rhythm, 714  
 — changes induces, 366  
 — and chills, 366, 713  
 — and cholesterol, 365  
 Glycerol convulsions, 714, 715  
 — and desoxycorticosterone acetate, 367  
 — and fatty acids, 135  
 — healing of wounds, 365  
 — and hemorrhage, 440  
 — hypertension, 366  
 — and monomolecular layer, 363  
 — pain, 364, 422  
 — and patterns, 368  
 — and radiation lesions, 365  
 — and saturated fatty acids, 362  
 — and S.d.c. pH, 603  
 — and trauma, 424  
 — and tumors, 365  
 — and viruses, 364  
 Glycerophosphoric acid and cancer, 533  
 — — bound to fatty acids, 130, 137, 362  
 — — and postoperative pain, 426, 723  
 — — and S.d.c. pH, 603  
 — — thyroid effects, 369  
 Glycine, 545  
 Glycogen in foci, 60  
 Grafts of tumors in humans, 214  
 Gram positivity and lipids, 157, 369  
 Granulocytes and hemoshock, 172  
 — lysis, 174  
 Grass-tetany and magnesium, 355  
 Growing tumoral mass, 40  
 Growth and butanol, 379  
 — inducing factor and potassium, 396  
 Guillaumin indicator, 566  
 Gumatous and iodine, 404
- HALOGENIC compounds of fatty acids, 328  
 Headaches, 422, 423  
 Healing process and butanol, 422  
 — — of tissues, 161  
 — — and polyunsaturated alcohols, 426  
 — — postoperative, 422, 426  
 — — radiation lesions, 365  
 — — and unsaponifiable fractions, 371  
 — — wounds, 365  
 Hearing impairment as acid-base symptom, 61  
 — — patterns, 73, 431  
 — — therapeutic essays, 430, 724  
 Heart, see also cardiac system  
 — block and lipoids, 622  
 — and unsaponifiable fraction, 372  
 Heat inactivation of viruses, 294  
 — treatment of fatty acid, 700  
 Heavy elements, 361  
 Hemangiomas tumors, 401, 653  
 Hemoclasia, 172  
 Hemoconcentration in shock, 228  
 Hemoglobin and copper, 359

- Hemoglobinuria "a frigore", 229, 673
  - — diphasic phenomenon in, 674
  - — exercise effect, 676
  - — and leucolysis, 229, 675
  - — morphine effect in, 679
- Hemophilus influenza, 295
- Hemorrhage, 371, 439-450
- Hemorrhagic agents, 336, 439-440
  - — and convulsions, 448
- Hemoshock, 172, 669, 670
- Hemostatic effect, 444
- Heparin, 569
- Heptanoic acid, 656
- Heptanol, accumulation of fluid, 721
  - and arteriosclerosis, 458
  - and burns, 426
  - coma, 660
  - and infection, 721
  - and itching, 432
  - induced changes, 383
  - and pain, 422
  - and postoperative pain, 426
  - and S.d.c. pH, 602
  - and trauma, 424
  - and tumors, 384
  - therapy of cancer, 533, 534
  - urine analyses, 385
- Heptylamine, 390
- Heptyl aldehyde, 422
- Heptyldiselenide, 533
- Heredosyphilis, 204
- Heterogeneity of the transplant, 206
- Heterogenization of body constituents, 171
- Heterogenous entities, 179
  - fatty acids, 326
  - tumors, 213
- Heterotropic elements, 105, 349
- Heterotropy, 2
  - in defense, 224
  - and growing tumoral mass, 40
  - opposing the homotropy, 221
- Hexadecyl mercaptan, 333
- Hexanol, 122, 382
- Hexavalent sulfur, 340
- Hexylamine, 123, 390
- Hexyl mercaptan, 332, 333
- Hexyldiselenide, 533
- Hexylselenoic acid, 344
- Hexylthionic acid, 338
- Hierarchical organization, 12, 24, 183, 221
- Higher alcohols and arteriosclerosis, 458
- Histidine, 169
- Histones, 41, 546
  - and radiation, 236
- Homopolar bond, 6
- Homotropic elements, 105, 349
  - processes and ulceration, 224
- Hormones and carcinogenesis, 301
- Horse radish peroxidase, 409
- Human placenta, see placenta
- Hyaluronidase, 649
- Hydrazo derivatives, 275
- Hydrogen peroxide, 345
- Hydroids, 119
- Hydrolytic products, 192
  - digestion in shock, 228
  - enzymes, 191
  - rancidity, 128
- Hydrophobic group, 119
- Hydronaphthalene persulfides, 491, 533
- Hydroperoxides, 129, 408, 409, 617
  - of fatty acids, 131
- Hydrophilic group, 119
- Hydropersulfide in cancer therapy, 481, 533
  - and microbes, 334
  - and pain, 422
  - and patterns, 334
- Hydrosphere, 547
- Hydroxonium ion and resonance, 8
- Hyperalgesia, 554
- Hyperkalemia, 353, 614
- Hyperchromia and offbalance A, 399
- Hyperleucocytosis, 166
- Hypertension, 166, 172, 173
  - and adrenal fatty acids, 371
  - and glycerol, 366
- Hyperthermia, 166
- Hypochromia and offbalance D, 399
- Hypokalemia, 397
- Hypotension, 166, 226
- Hyponatremia, 397
- Hypothermia, 166, 174, 226
- Hypnotics, 604
- IMMUNE antibodies, 182
  - sera, 198, 199, 201, 203
  - stage of defense, 183
- Immunity against viruses, 218
- Immunological aspect of cancer, 212-220
  - — against cells and tissues, 206
  - — therapeutic approach, 218
- Impairment of circulation and shock, 226
- Increased permeability in shock, 232
- Incubation time in allergy, 185
  - — infectious diseases, 195, 196, 197
- Index of excretion and retention, 595
  - of repartition of anesthetics, 125
- Indigorubine, 89, 593
- Indigotin, 89, 593
- Individualized treatment, 413
- Indoxyl in urine, 86, 89, 132, 593

- Induced carcinogenesis, 268, 290, 703
  - and conjugated fatty acids, 703
  - convulsions, see convulsions
  - shock, 679
  - tumors, see carcinogenesis
- Infection and abnormal fatty acids, 319
  - destructive, 295
  - neoplastic, 295
- Infectious disease, allergic and toxic pathogenesis, 195
  - incubation, 196
  - systematization of, 196
- Inflammatory form of breast carcinoma, 215
- Inorganic acids and S.d.c. pH, 602
- Insomnia, 83, 166, 373
- Insulin and potassium, 398
  - and zinc, 401
- Intake of food and itching, 62
  - — — and pain, 45
- Intensity of stimulus and itching, 562
- Intermediary lysates, 194
- Internal sea, place in organization, 30
- Interstitial fluids and elements, 107
  - — pH and pain, 55
- Interviews of cancer patients, 308
- Intestinal absorption of fatty acids, 135
  - secretions in shock, 230
- Intestines and lipids, 162, 372
- Intracellular potassium, 547
  - vacuoles in shock, 232
- Intractable diarrhea, 372
- Intracytoplasmatic viruses, 290
- Intranuclear viruses, 290
  - vacuoles in shock, 232
- Intravenous injection inducing shock, 226
- Invasive phase of cancer, 40, 396
  - — and potassium, 396
  - — and smegma, 305
  - — and sterols, 306
- Invasiveness and calcium, 357
- Iodine, 105, 404
- Ionizing radiation, 545
- Iridocyclitis and glucosamine, 439
- Iron, 105, 399, 600, 604
- Irradiated wound, 251
- Irradiation, see Radiation
- Irreversible fixation of chlorides, 134
- Isamine blue and hemorrhage, 440
- Ischemic infarct and cholesterol, 370
- Isotropic resonance forms, 302
- Itching as acid-base symptoms, 61
  - and intensity of stimulus, 562, 563
  - pathological and physiological, 61, 62
- KALEMIA, 166
- Karyorrhexis, 82, 160
- Kekulian forms in benzene, 8, 3
- Knoop oxidation, 129, 131, 616, 618
- Kupffer cells and cholesterol, 456
- LACTIC acid pain and foci, 60, 561
- Lanthanum series, 106
- Lauric acid, 601, 639
- Lead, 105, 353, 361
- Lecithine, 130, 362
- Leprosy, 197
- Leucocytes and butanol, 379, 719
  - collargol and morphine, 167, 670
  - and fatty acids, 313, 316, 328
  - and mercaptans, 332
  - and offbalances, 86, 102
  - in shock, 174, 228, 669, 670, 671
- Leucopenia, 102, 166, 172, 229, 316, 673
  - and exercise, 671
  - and lipids, 668
- Leukoses, 298
- Level chemotherapy, 526
- Levels in organization, 12
  - — — and arteriosclerosis, 453
  - — — and biological entities, 20, 24
  - — — and boundary, 16
  - — — and cancer, 38, 302
  - — — and defense, 183
  - — — dualistic patterns, 82
  - — — and elements, 107, 349, 394
  - — — and genetics in cancer, 302
  - — — and immunity, 218
  - — — immunological approach in cancer, 212
  - — — and lipids, 154
  - — — and shock, 227
  - — — and viruses, 690
  - — — and water circulation, 30
  - subnuclear, 543
- Liberation of fatty acids
  - of potassium in shock, 232
  - of sterols, 316
- Life and organization, 32
- Linoleic acid and blood patterns, 315
  - — and carcinogens, 708
  - — and CO<sub>2</sub>, 354
  - — and thiamine convulsions, 315
  - — defense against, 639
  - — as essential fatty acid, 621
  - — as lipid, 129
  - — and pain, 315
  - — and quenching of fluorescence, 697
  - — radiation of, 238
  - — and S.d.c. pH, 601
  - — and systemic influence, 315
  - — and tumors, 315
- Linoleic alcohol, 388

- Linolenic acid, defense against, 639
  - as essential fatty acid, 621
  - as lipid, 129
  - and quenching of fluorescence, 697
- Lipamine, 390
- Lipase in rancidity, 128
- Lipidic system, 125
- Lipido-proteic antigens, antibodies, 181
- Lipids and agglutinins, 672
  - analyses, 134, 622, 626, 627
  - biological properties, 125
  - and cancer, see specific lipids
  - and cancerous cells, 220
  - and carcinogenesis, 293, 305
  - cardiac rhythm, 169, 714
  - and cellular changes, 160
  - in cenapse, 622
  - and convulsions, 163
  - and cytolytic activity sera, 691
  - cytoplasmic, 160
  - and defense, 159, 176, 191, 205
  - definition, 615
  - and diuresis, 162
  - and drosophila melanogaster, 159
  - and free fats, 622
  - and immunity, 671
  - and induction of pain, 657
  - and leucocytes, 668
  - methods investigation, 134, 622, 626, 627
  - and microbes, 157, 671
  - and nervous system, 163
  - and old age, 646
  - and organs, 162
  - oestral cycles, 164
  - and oxygen transport, 667
  - and pain, 160
  - and patterns, 657
  - and phages, 656
  - potassium and sodium blood content, 166
  - and protozoa, 158
  - in shock pathogenesis, 225, 227, 229, 233, 625, 667
  - and radiation, 236, 238, 242, 252, 262, 625, 683
  - and red cells, 164, 662
  - — — — rouleaux and sludge formation, 678
  - — — — sedimentation rate, 662
  - and serum cholesterol, 668
  - and starvation, 624
  - and sulfur mustard, 625
  - and temperature, 654
  - and tetrahymena pyriformis, 646, 656, 657
  - and transplants, 209, 653
- Lipids and tumor chlorides, 716
  - and viruses, 155, 156, 293, 296, 322, 372, 655
  - and Walker tumors, 625
  - and wound healing, 657
- Lipid-treated antigens, 208
  - — microbes, 671
- Lipoacids, 117
  - and adrenals, 658
  - of blood, 318
  - fractions, 317
  - mixtures, 533
  - of placenta, 318
  - S.d.c. pH, 601
  - treatment in successive generations, 717
- Lipoalcohols, 122, 123, 375, 388, 601
- Lipoaldehydes and pain, 422
- Lipobases, 117
- Lipoidic epoxides, 409
  - peroxides, 409
  - properties, biological, 125
  - — chemical, 124
  - — physical, 119
- Lipoids, see specific substances
  - activity, organic level, 162
  - and cancer, see specific lipoids
  - cardiac rhythm, 661
  - character, 694
  - chemical properties, 124
  - and convulsions and coma, 659
  - and cortisone, 660
  - definition, 114, 615
  - with selenium, 342, 343, 344, 524, 533
  - solubility, 114
  - and survival time, 656
  - and thiamine, 659
  - and thiol group, 330-340
  - and tumors, see specific lipoids
  - and tumor transplants, 653
  - and viruses, 154, 296
- Lipoid-treated microbes, 205
- Lipolytic enzymes, in rancidity, 128
- Lipophilic group, 119
- Lipothiols, 115, 330, 477, 709
- Lithium and S.d.c. pH, 600
- Lithosphere, potassium, 547
- Liver antianemic extract and S.d.c. pH, 604
  - cells and copper, 111
  - cytochrome oxidase and copper, 359
  - damage and chlorides, 404
  - desaturation of fatty acids, 619
  - insufficiency and unsap. fractions, 372
  - regeneration, 161, 162, 658, 659
  - saturation of fatty acids, 619
- Living vaccines, 219

- Local acidosis or alkalosis, 60, 102  
     see also S.d.c. pH  
 — anesthetics, 391  
 — effects of radiation, 250  
 — pH and pain, 55, 58  
 Loss of emotional relationship and cancer, 308, 309  
 Luetin reaction, 203  
 Lugol's solution, 405  
 Luteoids, 143, 144, 633  
 Lymph and elements, 107  
 Lymphatic system and adrenals, 309  
     — and ethylmercaptan, 332  
     — in organization, 19  
     — and radiation, 257  
     — and selenium, 343  
     — tissue, 102  
 Lymphocytes, effects in vitro, 671  
     — and radiation, 211, 257  
 Lymphomas and psychological conditions, 308  
 Lymphomatosis virus, 295  
 Lymphopenia and radiation, 257  
 Lypocytic index, 664  
 Lypolytic enzymes in rancidity, 128  
 Lysine, 169  
 Lysis of cancer cells, 694  
     — — — magnesium, 355  
     — of granulocytes, 174  
     — of thrombi, 355  
 Lytic activity and lipids, 364, 694
- MAGNESIUM, 105, 337, 354, 356, 533, 712  
 — and adrenals, 172  
 — changes induced by, 354, 355, 356  
 — and periodic chart, 105, 353  
 — and S.d.c. pH, 600  
 — in treatment of cancer, 337, 482, 533  
 Maintenance of constants and organization, 33  
 Male hormone, 139  
     — and cholesterol paraplegia, 371  
     — and S.d.c. pH, 603  
     — and sulfur mustard, 347  
 Maleic acid, 410  
 Malignancy and calcium, 356  
     — and potassium, 397  
 Manganese and S.d.c. pH, 600  
     — compounds, 410  
     — and tumors, 360  
 Manic-depressive condition, 75  
 Marital status and cancer, 308  
 Masked virus, 294  
 Massive necrosis and sulfur mustard, 346  
 Mature eosinophile granulae, 569  
 Measles, 197
- Mechanical trauma and shock, 226  
 Melting point of fatty acids, 130  
 Membrane permeability and radiation, 253  
     — — role of calcium ion, 127  
     — — role of lipids, 166  
     — with two polar faces, 126  
 Meningococcic infection, 197  
 Mental exercise and lipids, 151  
 Menthol excretion, 147  
 Mercaptans, 330, 334  
     — see also Ethylmercaptan  
     — pharmacology, 330  
     — and specific substances  
 Mercury in periodic chart, 105  
     — pharmacology, 402  
     — and S.d.c. pH, 600  
 Metastases and calcium, 357  
     — immunological aspect, 217  
 Metazoic compartment and elements, 107  
     — in organization, 27  
 Meteorological influence, 561  
 Method of application of agents, 416  
 Methods of investigation of lipids, 134, 622, 626, 627  
 Methionine, 169, 314  
     — and molybdenum, 399  
 4 Methoxy-3, 4 Benzpyrene, 696  
 Methyl alcohol, 122, 602, 608  
     — ketones in rancidity, 128  
     — mercaptan, 123, 330  
 Methylcholanthrene and filtrable tumors, 300  
     — forces in, 273  
     — induced tumors, 703  
     — quenching of fluorescence of, 696  
     — spectral analysis, 283  
 Methylene blue, 604  
 Methyleneimine 1: 3: 5 Triazine, 281  
 Methylthioglycolate, 339  
 Mezons, 545  
 Micelles, 10  
 Microbes and lipids, see specific substances  
     — and arachidonic acid, 316  
     — and conjugated fatty acids, 322  
     — and ethylmercaptan, 330  
     — lipid-treated, 671  
     — and molybdenum, 399  
     — and phages, 656  
     — place in organization, 26  
     — and saturated fatty acids, 312  
 Migraine headaches, 423  
 Milk factors, 293  
 Milliar gastric ulcerations in shock, 228, 329

- Mitochondria, 126  
 — membrane, 616  
 — pre-ferments, 223  
 Molecular oriented layers, 123  
 — — — and glycerol, 363  
 Molecules, forces, 6, 9  
 Molybdenum, pharmacological activity, 399  
 Mono ammonium phosphate and pain, 54  
 Monocellular organisms, 312  
 — — place in organization, 26  
 Monoethenic fatty acids, 313  
 — — — position of double bond, 618, 619  
 Mono-glycerides, 135  
 Monstrosities, 159  
 — and carcinogens, 268  
 — and ontogenetic allotropy, 303  
 Morphine and hemoglobinuria a frigore, 679  
 — and shock, 174, 229, 670  
 Morphological changes as pattern, 159  
 Motion of particles in organization, 11  
 Multiple carcinogenesis, 270  
 Multiplication and organization, 31  
 — of viruses, 690  
 Mumps, 197  
 Muscular exercise and lipids, 151  
 — — and shock, 671  
 Mutations and carcinogens, 268  
 — ontogenetic allotropy, 303  
 Myocardial infarct, 7th day manifestation, 211  
 — — and oxygen, 407  
 — insufficiency and unsaponifiable fractions, 372  
 Myristic acid, 639  
 Myxoma virus, 295
- NAPHTHALENE perselenide, 344  
 — — and Ca therapy, 519, 533  
 2-naphthylamine, 273  
 Narcotics, 604  
 — and anti-hemorrhagic action, 448  
 Nasal pH, 83, 102, 565  
 Nature, dualism in, in, 35  
 — oscillatory movement in, 34  
 Neck pain, 422  
 Necrosis of tumors, 160, 387  
 Negative phase in heart physiology, 660  
 — — in defense, 173  
 Neoglucogenic corticoids, 144  
 — — and coma, 659  
 — — and conjugated fatty acids, 362  
 — — and convulsions, 659  
 — — and defense, 640  
 — — and glucosamine, 637
- Neoglucogenic corticoids pharmacology, 372  
 — — template formation, 636  
 Nervous system and lipids, 163  
 Neuralgia, 423  
 Neurolymphomatosis virus, 295  
 Neutralizing antibodies, 182  
 Neutrons, 545  
 — in therapy, 260  
 NH<sub>2</sub> as polar group, 120  
 Nickel, 105, 401  
 Nickethamine and hemorrhage, 440  
 — and pain, 422  
 — and trauma, 424  
 Nitrogen, 108  
 — mustard and carcinogenesis, 278  
 — — quenching effect, 709  
 Nitrogenous bases, 130, 546  
 Nitromethane, quenching effect, 709  
 Nocifensor nerve system, 554  
 Nonanol, 383, 602  
 Non-invasive cancer, 39, 550  
 Nonketonic fractions, 373  
 Nonnecrotic tumors, 160  
 Nonsaponifiable fractions, see unsaponifiable  
 Unsaturated fatty acids, see Unsaturated  
 Norbixine transportation, 694  
 Normality, 36  
 Noxious stimulus and pain, 45  
 — — and shock, 225  
 Nuclear compartments, 23, 27, 107  
 — — vacuoles and lipids, 160  
 Nuclei in non-invasive cancer, 550  
 — place in organization, 17, 18, 23  
 Nucleoli, place in cancer, 550  
 — — in organization, 23  
 Nuts of parinarium laurinum, 320
1. 2. OCTANEDIOL, 387  
 1. 8. Octanediol, 123  
 Octanol, 380, 382, 602  
 Oestral cycles and lipids, 164  
 Offbalances, 93  
 Offbalance A and agents, 411  
 — — analyses, 95  
 — — and arteriosclerosis, 453  
 — — and cancer, 99, 532, 535, 537, 540, 546  
 — — and elements, 105, 349, 353, 394  
 — — manifestations, 102  
 — — and sterols, 371  
 — — trauma, 423  
 — — wounds, 214  
 — — see also specific agents and analyses  
 Offbalance D, agents, 411  
 — — analyses, 95

- Offbalance D and cancer, 99, 532, 535, 537, 540
  - — and elements, 105, 349, 353, 394
  - — and radiation, 261, 683
  - — and trauma, 423
  - — see also specific agents and analyses
- OH as polar group, 120
- Old age and lipoids, 646
  - — — procaine, 393
  - — — wheal resorption time, 419
- Oleic acid, adrenal defense, 639
  - — bacteriophages, 313
  - — dermatrope viruses, 314
  - — and oxidation, 129
- Oleic alcohol, 388
- Oliguria, 83, 166
- Ontogenesis, 24
- Ontogenetic allotropy, 303
- Opium alkaloids, 229, 604
- Organic level, 23
  - — and cancer, 40
  - — dualism, 83
  - — elements, 110
  - — manifestations, 162, 163, 164
- Organism level, see systemic
- Organization and antientropy, 3, 5
  - atom, 3
  - basic concept, 1
  - biological realm, 17
  - in cancer, 38-42
  - and cations, 27
  - and constants, 33
  - and death, 32
  - and hierarchic entities, 12, 20
  - of immunity, 186
  - and levels, 12
  - and life, 32
  - micelles, 10
  - molecules, 6
  - and motion of particles, 11
  - and multiplication, 31
  - and phylogenetic development, 24, 222
  - and polymolecular formations, 9
  - social, 19, 548
  - and solar energy, 33
  - subatomic, 11
  - subnuclear, 543
  - and water circulation, 30
- Organization role, fatty acids, 135
  - — glycerophosphoric ion, 363
- Organized boundary, 16
- Origin of allopregnane, 361
  - of aminosugars, 636
  - of cholesterol, 139
- Oriented, molecular layers, 123
- Oscillatory movement, 34, 172
  - — and defense, 223
- Osteo-arthritis, 450
  - — pain and acid-base balance, 50
  - — therapy, 435
- Osteomalacia and copper, 359
  - and molybdenum, 399
- Otological conditions, 67, 73, 428, 430
- Oxalic index, 238, 680
  - and radiation, 240, 245, 251, 253, 682
  - and shock, 227, 248
- Oxidase and ammonium molybdate, 399
- Oxidation, abnormal, 132, 147
  - of fatty acids, 129, 131, 133, 354, 616, 618
- Oxidative desamination, 354
  - fission of fatty acids, see oxalic index
- Oxidizing substances, see also peroxides
  - — and radiation, 254, 525, 594, 683
  - — and selenium, 343
  - — in urine, 89, 102, 132, 265-266
- Oxidoreduction potential of foci, 59
  - — of urine, 86, 89, 102, 590
- Oxygen, 108, 345
  - and anoxybiotic process, 407
  - and conjugated fatty acids, 700
  - fixation of, 166
  - and pain pattern, 405
  - sedative effect of, 407
  - therapy, 406
  - transport, 657
- PAIN, 43-61, 83, 102, 313, 314, 316, 317, 380, 421, 532, 552
  - see also specific agents
  - and acid-base balance, 46, 561
  - ammonium chloride, 54
  - in arthritis, 435
  - and bixin, 324
  - and butanol, 380
  - conjugated fatty acids, 322
  - different agents, 422
  - dualism, 43, 45
  - ethylmercaptan, 331
  - and glycerol, 364
  - heptanol, 422
  - hydroperselenide, 344
  - hydropersulfide, 334
  - and intake of food, 45
  - lipids and lipoids, 160, 657
  - and local pH, 55, 58
  - mono-ammonium phosphate, 54
  - osteoarthritis, 50
  - and oxidoreduction potential, 59
  - and oxygen, 405, 407
  - pathological, 44, 47, 553
  - patterns, 47, 532, 561
  - perselenide, 344
  - physiological, 44, 552



- Pain and potassium, 49, 421
  - propionic aldehyde, 536
  - and radiation, 253
  - as sensorial sensation, 552
  - sodium bicarbonate, 54
- Painful phase of cancer, 40
- Palmitic acid, 601, 639
- Pancreas and zinc, 401
- Pancreatic secretions, 230
- Papilloma, 292
- Para-amino-benzoic-acid, 393
- Paralysis, diphtheria, 199
  - of the posterior limbs in shock, 226
  - induced by cholesterol, 371, 644
- Parasyphilitic manifestations, 204
- Parinaric acid, 320, 700, 703
  - — quenching effect of, 707
- Parinarium laurinum seeds, 700
- Paroxysmal hemoglobinuria, 673
- Paroxysmic tachycardia and lipoids, 662
- Partial inactivation of viruses, 294
- Pathogenic action of fatty acids, 135
- Pathogenesis of cancer, 264
- Pathological changes in shock, 227
  - hemorrhage, 439
  - itching, 61, 563
  - pain, 44, 47, 553
- Patterns, blood, 86
  - in cancer, 99
  - in dyspnea, 77
  - and fatty acids, 148, 168
  - of impaired hearing, 73, 430
  - of itching, 61, 435
  - and levels, 82, 83
  - and manic depressive, 75
  - of pain, 45, 421
  - and sterols, 148, 168
  - in trauma, 423
  - in urine analyses, 86, 90
  - in vertigo, 67, 428
- Pauli exclusion principle, 4
- Pemphigus and glucosamine, 438
- Pendant drop surface tension, 575
- Penetrating rays, 260
- Pentaenic fatty acids, 374, 700
  - — — and adrenals, 374
- Pentanol, 383
- Per-acids, 345
- Perfume rancidity, 128
- Periodic chart, elements, 105, 349, 394
- Peritoneal petechiae, 228
- Peritumoral fats and mercury, 402
- Permeability, cell membrane and fatty acids, 129
  - — — and sterols, 127
- Peroxidases, 409
  - in rancidity, 128
- Peroxides, 146, 409
  - of fatty acids, 129, 132, 327
  - and iodometry, 593
  - and radiation, 254, 525, 594, 683, 726
  - and schizophrenia, 419, 594
  - and selenium, 343
  - in urine, 86, 102, 132, 254, 265-266, 525, 592
- Perselenides, 344, 519, 533
- Persulfides, 336, 422, 491, 533
- Pertussis, 197
- Petechiae, 228
- pH, see also S.d.c. pH
  - local, 55, 166, 316
  - tumors and glucose, 368
  - urine, 90, 532, 557
- Phages and arachidonic acid, 316
  - and glycerol, 364
  - and lipids, 656
  - see also specific agents
- Pharmacology, see pharmacodynamic activity
- Pharmacodynamic activity
  - — abnormal fatty acids, 319
  - — acid lipidic fractions, 317
  - — agents with negative polar group, 312, 329
  - — — positive polar group, 362, 375
  - — alcohols, 375, 380, 389
  - — alpha hydroxy fatty acids, 326
  - — — thio fatty acids, 338
  - — antifatty acids constituents, 362
  - — antioxidants, 409
  - — arsenic, bismuth, mercury, 402
  - — bixine, 324
  - — butanol, 375
  - — calcium, 354
  - — cations, 395
  - — chlorine, fluorine, 403
  - — cobalt, 360
  - — compounds with thiol groups, 335
  - — copper, 358
  - — corticoids, 372
  - — diols, 387
  - — elements, 349, 361, 391
  - — epichlorohydrin, 348
  - — fatty acids, 312, 326
  - — glucose, glycerophosphoric acid, 368
  - — glycerol, 363
  - — halogen compounds fatty acids, 328
  - — heavy elements, 361
  - — heptyl- and hexyldiselenide, 343
  - — hydropersulfides, 334
  - — iodine, 405
  - — iron, 399
  - — lipoalcohols, 388

- Pharmacodynamic activity magnesium, 349
- — manganese, 360
  - — mercaptans, 330
  - — monovalent cations, 395
  - — oxygen, 405
  - — — peroxidases, 409
  - — — polyols, 387
  - — — potassium, 399
  - — — procaine, 391
  - — — saturated fatty acids, 312
  - — — selenium lipoids, 342
  - — — sterols, 369
  - — — sulfur compounds, 340
  - — — — mustard, 346
  - — — tetrahydronaphthalene perselenide, 344
  - — — persulfides, 336
  - — — thioglycolic series, 338
  - — — thiosulfates, 336
  - — unsaponifiable fractions, 371
  - — unsaturated fatty acids, 313
  - — zinc, 401
- Phenol excretion, 147
- Phlebitis and wheal resorption, 566, 567
- Phosphates excretion, 86, 102, 166, 595
- Phospholipids, 136, 369
- and copper, 359
- Phosphorus and cancer, 359
- Phylogenetic allotropy, 302
- development and defense, 222
  - and organization, 24
- Physical exercise and shock, 229, 671
- Physicomathematical approach to carcinogenesis, 270
- aspect of lipoids, 615
- Physiological itching, 562
- pain, 44, 552, 562
- Phytosterol, 369
- Pituitary glands and copper, 360
- Place in organization, animals, 30
- — — biological realm, 20
  - — — chromomeres and chromomata, 17, 18
  - — — genes, 26
  - — — internal sea, 30
  - — — micelles, 10
  - — — microbes, 26
  - — — monocellular organisms, 26
  - — — nuclei, 17, 18
  - — — nucleolus, 23
  - — — plants, 30
  - — — polymolecular formations, 9
  - — — protoplasmatic formations, 23
  - — — ribo-nucleic acid, 23
  - — — subnuclear realm, 543
  - — — viruses, 26, 690
- Placenta extracts and cancer therapy, 463
- fatty acids, 469
  - lipoacids, 679
  - unsaponifiable fractions, 257, 371, 429, 469, 656, 679, 710, 715
- Plague, 197
- Plants, place in organization, 30
- Plastic surgery and butanol, 443, 725
- Plasma bicarbonate, 555
- Pleural petechiae, 228
- Plurality of phases in cancer, 264
- Pneumococcic pneumonia, 198
- Pneumonia, crisis, 198
- Polar groups, 120
- Polar nucleophilic centers, 144
- Polarity of tetrahymena, 158
- Poliomyelitis, 197
- paralysis, 654
- Polyalcohols, 387
- Polyconjugated fatty alcohols, 388
- Polycyclic chain, 137
- Polyethylene amines, 278
- Polymolecular formations, place in organization, 9
- Polyols, 387
- Polyunsaturated alcohols and arteriosclerosis, 458
- — pharmacology, 388
  - — and trauma, 424, 426
  - — and treatment of cancer, 533, 534
  - fatty acids and pain, 422
  - — — and sterols, 369
  - — — transport, 695
  - — — treatment of cancer, 468
  - — — tumors, 313
- Polyuria, 83, 102
- Porphyrinic acids, 146
- Positive amino acids and cancer, 169, 551
- — — and radiation, 236
  - carbons of fatty acids, 131, 132, 621
  - charged lipoids, 118
  - negative dipolarity, 141
  - phase in hemoshock, 183
- Positron, 544
- Postoperative care, 442
- healing period, 426
  - pain, 424
  - treatment, 426
- Potassium and ACTH, 398
- in blood, 86
  - and calcium, 356
  - in cancer, 396, 547
  - and cellular compartment, 610
  - content of blood serum and pain, 49
  - content and lipids, 166
  - distribution, 547
  - and glucose, 398

- Potassium and heart, 614  
 — in hemoshock, 612  
 — in hydrosphere and lithosphere, 547  
 — and insulin, 398  
 — intracellular, 547  
 — iodide, 405  
 — and metazoic compartment, 610  
 — and meteorological influences, 651  
 — and muscle activity, 611  
 — and offbalances, 357, 613  
 — and pain, 49, 60  
 — and periodic chart, 105, 111  
 — and red cells, 611  
 — S.d.c. pH, 600  
 — and selenium, 615  
 — in therapy, 615  
 — thiosulfate, 337  
 — in total blood, 415  
 Precancerous lesions, 268, 550  
 — phase, 39  
 Precipitation, 179  
 Pre-ferments in mitochondria, 223  
 Pregnancy, urinary surface tension, 588  
 Present form of cancer treatment, 531  
 Preterminal phase of cancer, 40  
 Preventive action of elements in cancer, 355, 358, 360  
 Previruses, 691  
 Primary stage of defense, 178  
 — syphilitic lesion, 203  
 — toxic processes, 178  
 — tuberculous chancre, 204  
 Principal parts in organization, 13  
 Problems in cancer, 264  
 Procaine, 291, 604  
 — and angina pain, 392  
 — and old age, 393  
 Progesterone, 144, 604  
 Proliferation of connective tissue, 407  
 Prolongation of the life span, 159, 656  
 Prolonged cellular youth, 82, 102, 658, 661  
 — hemoshock, 176  
 — phases of shock, 176  
 Promezons, 545  
 Propanoic acid, 121  
 Proper level element, 350  
 Properdin system, 215  
 — and magnesium, 355  
 Propionic aldehyde, 123, 329, 422, 533  
 Propyl alcohol, 122, 602  
 — isocyanide, 123  
 — mercaptan, 332  
 Prostate and zinc, 401  
 Prostatectomy and butanol, 723  
 Prostatic cancer and circumcision, 305  
 Protamines and heparin, 569  
 — and radiation, 236  
 Protective antibodies, 191  
 Protein hydrolysis and shock, 174, 227  
 Proteolytic enzymes and hemorrhage, 444  
 — and hemoshock, 174  
 Proteopathic sensations, itching, 562  
 Protoplasmatic formations, place in organization, 23  
 Protons, 545  
 Psychic states, adrenals, 309  
 Psychological factors and cancer, 308  
 Pycnosis, 82  
 — and lipids, 160  
 Pyretogenics, 604  
 Pyruvic acid, in foci, 60  
 QUALITATIVE abnormality elements, 350, 351  
 Quantas and organization, 33  
 Quantum analysis of carcinogenesis, 271  
 Quantum forces *in atom*, 4  
 — in micelles, 10  
 — in molecules, 6, 9  
 — as organizational forces, 5  
 — polymolecular formations, 9  
 Quenching of fluorescence of carcinogens, 695  
 — see also specific agents  
 — conjugated fatty acids, 697  
 — conjugated tetraenes, 703  
 — different agents, 709  
 — eleostearic acid, 699  
 — fish oil fatty acids, 698  
 — of methylcholanthrene, 696  
 — parinaric acid, 707  
 Quinine, 604  
 RABBIT brain, 156  
 Rabies, 197, 202  
 Radiation, 236-263, 380, 545  
 — and adrenal, 257  
 — and biological realm, 26, 545  
 — burns and lipoids, 380  
 — and cancer, 261, 262, 529, 638, 726  
 — and chemotherapy, 524, 726  
 — and erythema, 250  
 — and fatty acids, 236, 238, 248, 258, 254, 319, 322, 524  
 — induced offbalances, 261, 683  
 — ionizing, 545  
 — lesions, 249, 254, 256, 316  
 — and lipids, 236, 238, 242, 252, 262, 625, 683  
 — and lymphatic organs, 257  
 — and membrane permeability, 253

- Radiation and oxalic index, 238, 240, 245, 251, 253, 682
- and pain, 253
- and proteins, 236, 257
- ulceration, 250
- and unsaponifiable fractions, 256, 371, 429
- and urine analyses, 254, 255, 261, 262, 524, 525, 683, 726
- and vascular lesions, 254, 256
- and zinc, 401
- Radioactive sodium, 253
- sources, 241
- Radiomimetic effect of fatty acids, 259
- Radiotherapy, 524, 638
- biologically guided, 261
- and chemotherapy, 726
- Radium burns, 252, 410, 427
- in monel metal, 240, 242, 252
- in platinum, 241
- Rancidity, abnormal fatty acids, 133
- of edible fats, 410
- of fatty acids, 128
- peroxidase, 129
- Rapid aging and calcium, 357
- cellular, 102, 166
- Rat sarcoma and ethylmercaptan, 332
- Reactivation of viruses, 294
- Rectum and lipids, 162
- Recurrent fever, 197
- Red cells, fatty acids, 315, 316, 662, 664, 665
- and lipids transport, 666
- and oxygen transport, 667
- and potassium, 611
- rouleaux and sludges, 678
- sedimentation rate, 86, 166, 663
- and sterols, 369, 370, 455, 663, 668
- vacuolation, 664
- Reduced metals, 399
- Regeneration of liver, 161
- and calcium, 356
- and lipids, 162, 658
- Relationship between corticoids, 637
- Renal active reabsorption, 90
- Renal colic, 432
- Renal excretion, 90
- Repeated passage and virus pathogenicity, 295
- Resonance forms, 8
- and allotropy, 302
- benzene, 8
- carboxyl, 8
- hydroxonium ion, 8
- in cancer pathogenesis, 302
- Residual charge, 544
- fluorescence, 696
- Respiratory oxybiotic phase and foci, 60
- Results, evaluation of, 417
- Retention index, 90, 594
- RFS and cholesterol, 456
- in defense, 223
- Rheumatic fever, 204
- Rheumatoid arthritis, 435
- Rhino-pharyngeal infections, 431
- Rhythm, cardiac, 659
- in nature, 34
- Ribo nucleic acid in organization, 28
- Ricinoleic alcohol, 388, 389
- Ricinoleic triglyceride, 136
- Rickettsia, 197
- Rigidity of the cyclic chain, 137
- Role of adrenals in defense, 638
- in radiation, 259
- in regeneration, 162, 658
- calcium permeability, 126
- constants in organization, 28
- fatty acids, 126
- lipids in blood physiology, 662
- Rouleaux formation and lipids, 678
- in shock, 233
- Rous sarcoma, 295
- Rubber hydroperoxides, 129
- Rubidium, 107, 398
- SUNFLOWER oil lipo-alcohols, 388
- Salivary gland and rabies, 299
- Salicylic aldehyde and pain, 422
- Saponifiable fractions, see lipoacids and acid lipidic fraction
- Saponine, 604
- Sarcomatoid character of tumors, 716
- transformation of tumors, 372
- Saturated fatty acids, caloric role, 129
- defense against, 639
- and glycerol, 362
- pharmacology, 312
- in rancidity, 128
- and S.d.c. pH, 601
- Saturation and desaturation in liver, 619
- Scar forming effect, radiation, 256
- Schizophrenia and butanol, 718
- and urine peroxides, 41, 419
- Sclerotic scar in hearing impairment, 43
- Screening project in cancer, 417
- Second day wound crust pH, 104, 313, 334, 336, 357, 380, 392, 597-613
- see specific agents
- biological factors, 608
- chemical agents, 599
- and physical agents, 607
- Sea constitution, 108

- Seasonal changes in viral infections, 297  
 Seasons and lipids, 152  
 Second law of thermodynamics, 2  
 Secondary antigens, 204  
 — — and environmental influences, 221  
 — parts in organization, 13  
 Sedative effect of oxygen, 407  
 Sedimentation rate and lipids, 662  
 Selective passage through membranes, 126  
 Selenic and selenious acids, 342  
 Selenium cancer therapy, 512, 518, 526, 530, 533, 534, 535  
 — lipoids, 342  
 — and oxidizing substances, 343  
 — periodic chart, 105  
 — and potassium, 615  
 — and S.d.c. pH, 600  
 Self sterilization of neuro-infections, 294  
 Semi-polar center in fatty acids, 131  
 Sensorial pain, 44  
 Separating membrane, 616  
 Serial treatment of tumors, 715  
 Serum albumin, 172  
 — antitryptic power, 172, 227  
 — cytolytic activity, 691  
 — and pain, 49, 421  
 — potassium, 111, 352, 415, 532  
 Seventh day manifestations, 210  
 Sex and hormones, 139  
 — and lipids, 149  
 Sexual intercourse and lipids, 151  
 SH, see sulphydryl  
 Shared electrons, 6  
 Sheep pox virus, 295  
 Shock, acute, 226, 679  
 — in advanced cancer, 420  
 — and alkaline substances, 30  
 — and butanol, 380  
 — and butanol-sodium lactate, 723  
 — and carbonate ions, 230  
 — and cellular vacuolation, 228  
 — and chlorides, 230, 396, 404, 419  
 — and cholesterol, 370  
 — and clinical manifestations, 226  
 — and dark color of blood, 225, 228  
 — and diphasic phenomenon, 227  
 — and fatty acids, 227-262, 319, 322, 667, 679, 680  
 — induction, 226, 233, 679  
 — and infectious diseases, 195  
 — and lipids, 225, 227, 667  
 — mechanism, 227  
 — and morphine, 174, 229, 670  
 — and oxalic index, 227, 248, 680  
 — pathogenesis, 225  
 — pathological changes, 227, 228, 232  
 Shock and physical exercise, 229, 671  
 — and red cells, 233  
 — and sodium chloride, 229, 231  
 — state of, 228, 232, 404, 419, 625, 679  
 — and sterols, 234  
 — superacute, 233, 679  
 — therapy, 234  
 — types of, 225  
 — and unsaponifiable fractions, 372  
 Silicon and calcium, 356  
 Skin allergy, 673  
 Skin wheal, 83, 102, 419, 566  
 Sleep and lipids, 150  
 Sloughing of wounds, 161  
 Sludge blood format., 166  
 — — — and lipids, 678  
 — — — in shock, 233  
 Smallpox and conjugated fatty acids, 322  
 — and lipids, 316, 654, 655  
 — receptivity and lipoids, 155  
 — and temperature, 156, 654  
 — and unsaponifiable fractions, 372  
 Smegma and cancer, 305  
 SO<sub>2</sub> as polar group, 120  
 Social hierarchic organization, 548  
 Sodium, alkaline compounds and pain, 60  
 — and atheromas, 395  
 — azide, 573  
 — benzoate, butanol, 720  
 — bicarbonate and pain, 54  
 — chloride and adrenalectomy, 712  
 — — and defense, 640  
 — — and shock, 229, 231, 404, 419  
 — distribution, 547  
 — excretion, 102  
 — index, 595  
 — lactate and butanol, 380, 427, 720  
 — and periodic chart, 105, 111, 394  
 — and radiation, 253  
 — and S.d.c. pH, 600  
 — tetrathionate, 338  
 — thiosulfate, 336, 482, 533, 709  
 Solar energy and organization, 33  
 Solubility of lipoids, 114, 119  
 Solvent fractionation of lipids, 622  
 Somnolence, 83, 102, 166  
 Species and phylogenetic allotropy, 302  
 Specific gravity, urine, 86, 102, 532  
 Spectral analysis, fatty acids, 134, 238, 626  
 — — of lipids, 626  
 — — methylcholanthrene, 283  
 Spermatozooids and zinc, 401  
 Splanchnic vasodilation in shock, 228  
 Spleen and radiation, 257  
 — and RES, 175

- Squalene and cholesterol, 631  
 Squid extracts, 673  
 Stapes mobilization, 430  
 Starvation, lipids, 624  
 Status epilepticus and magnesium, 356  
 Stearic acid, defense against, 639  
 Steric coupling, 142, 633  
   — position, 141  
 Steroids, 137, 146, 466  
   — deriving from arachidonic acid, 631  
   — and fatty acids, 316  
   — energetic centers, 635  
   — with a two-carbon chain, 143  
   — see also specific steroids  
 Sterols, see also cholesterol  
   — and arachidonic acid, 316, 631  
   — and Arneft's formula, 668  
   — and brain, 369  
   — and cancer, 369-373, 715  
   — and cancer therapy, 466  
   — and fever, 175  
   — functional role, 363  
   — and hemorrhages, 440  
   — as lipids, 141  
   — and patterns, 148-168  
   — and permeability, 127  
   — and polyunsaturated fatty acids, 362, 369  
   — and red cells, 369  
   — and S.d.c. pH, 603  
   — in shock, 234  
   — and viruses, 155, 297, 298, 654, 655, 656  
 Stomach mucous membrane and shock, 229  
 Stone, urinary and surface tension, 648  
 Street virus, 203  
 Streptococcal infections, 204  
 Strontium, 105, 361, 600  
 Subgroup incompatibility and shock, 226  
 Sublethal irradiation and oxalic index, 682  
 Subnuclear compartment, 26  
   — — elements, 108  
   — — organization, 543  
 Successive serial transplants, 715-717  
 Sulfa drugs, 604  
 Sulfate excretion, 86, 102  
   — and S.d.c. pH, 600  
 Sulfo-conjugated, 147, 342, 641  
 Sulfur, see also specific substances  
   — metabolism, 341  
   — — and copper, 359  
   — — mustard, 345  
   — — and induced lesions, 346  
   — — and lipids, 625  
   — — in periodic chart, 105  
   — in treatment of fatty acids, 700  
 Sulfuric anions, 147, 342  
 Sulfurized oil, see hydropersulfides  
   — — and cancer therapy, 481  
   — tetrahydronaphthalene, see sulfurized tetraline  
   — tetraline, 336, 422, 491  
 Sulfhydryl determination, 573  
   — excretion, 86, 166  
   — index, 385, 595  
   — — and radiation, 257  
   — and iron, 399  
   — and mercury, 402  
 Sunburn, 427  
 Suprarenine and S.d.c. pH, 604  
 Surface tension, see urinary surface tension  
 Syngated formations, 283  
 Synthesis of aminosugars, 145, 437, 636  
 Synthetic anti fatty acids, 375  
 Systemic analyses, 85  
   — level, 83, 164  
   — pattern, 83-90  
   — effect of lipids, 164, 165, 166  
 Symptomatic pain, 44, 552  
 Syphilis, 203  
 Systematization of infectious diseases, 196  
 Swine influenza, 295  
  
 Tachycardia, 83, 166  
 Tar preparations, tumors, 300  
 Teloradiotherapy, 260  
 Temperature body, dualism, 83  
   — — hydropersulfides, 334  
   — — and lipids, 152, 164  
   — of environment and S.T., 581, 582, 589  
   — and viral infection, 654  
 Template hypothesis, 636  
 Terminal phase, cancer, 41  
 Tert. Alcohols, 122, 123  
 Tertiary syphilitic lesions, 204  
 Tests for cancer, 264  
 Testosterone, 141  
   — and calcium, 358  
 Tetany, 355  
 Tetanus, 197, 202  
 9, 12, 13 tetrachlorostearic acid, 404, 405  
 Tetracic fatty acids, 700  
 Tetrahydronaphthalene, see Tetralin  
 Tetrahymena pyriformis, see also specific agents  
   — — fatty acids, 646  
   — — and glycerol, 364  
   — — and lipids, 158, 657  
   — — and procaine, 392  
   — — survival, 656

- Tetralin persulfides, 336, 422, 491, 533
  - perselenide, 344, 518, 533
- Tetrathiostearic acid, 335
- Therapeutic approach, see Treatment
- Thermal shock and oxalic index, 248
- Thiamine induced convulsions and fatty acids, 163
  - — — and thiosulfate, 337
  - — — see also specific agents
  - — — and hemorrhage, 440
- Thioglycolic series, 338
- Thiophene nucleus, 274
- Thiosulfates and cancer therapy, 482, 533
  - pharmacology, 336, 337
  - second day wound crust pH, 600
- Thorium, alpha particles, 241
- Thrombopenia and hemorrhagiparous agents, 441
- Thrombosis and cholesterol, 370
  - and magnesium, 355
- Thymus and radiation, 257
- Thyroid and glycerophosphoric acid, 369
- Thyroidectomy, 644
- Time of day, itching ad pain, 62
  - — and lipids and surface tension, 151
- Tissue level, 27, 40, 57, 83, 312
- Tissues, conjugated fatty acids, 322
- Titrimetric alkalinity of blood, 46, 557
- Tocopherols, 410
- Toluidine blue, 89
- Tongue cancer and iodine, 404
- Total blood potassium, 415, 571
- Toxic mechanism in defense, 196
  - stage in defense, 178
- Toxicity, see specific agents
- Transfusion and shock, 226
- Transitory somnolence and cholesterol, 370
- Transplanted tumors, 616, 715
- Transport of fatty acids, 695
  - of norbixine, 694
  - of oxygen, 657
- Traube stalactometer 576
- Trauma and acid-base balance, 50
  - and alcohols, 424
  - alkaline pattern, 423
  - and cholesterol, 370
  - and conjugated trienes, 375
  - and defense, 640
  - and heterogenization, 206
- Traumatic injuries and oxygen, 405
  - pain and butanol, 723
  - shock and fatty acids, 679
  - and oxalic index, 248
- Treatment of cancer, 461-542
  - — acid lipidic fractions, 468
- Treatment of agents, 533
  - — butanol, 493
  - — biological guided chemotherapy, 526
  - — cod liver oil fatty acids, 466
  - — conduct of treatment, 536
  - — conjugated fatty acids, 501
  - — criteria of, 532
  - — glycerol, 493
  - — heterogeneous agents, 508
  - — mercaptans, 476
  - — present form, 531-537
  - — radiation, 524
  - — selenium preparation, 512
  - — sterols, 466
  - — sulfurized oil, 481
  - — tetralin perselenide, 518
  - — persulfides, 491
  - — thiosulfates, 482
  - — unsaponifiable fractions, 468
  - — see also Other agents
- Treatments, guided, 413
  - agents, 416
  - criteria, 415,
  - evaluation, 417
  - individualized, 413
  - in successive generations, 715
  - tumors in animals, 417
  - of other conditions than cancer, 418
  - of acid-base manifestation, 420
  - of allergic conditions, 451
  - of arteriosclerosis, 457
  - of arthritis, 435
  - of burns, 426
  - of gallbladder colic, 435
  - of hearing impairment, 430
  - of hemorrhage, 439
  - of itching, 435
  - of pain, 421
  - of trauma, 423
  - of vertigo, 428
- Trichlorethylene, 404
- Trigeminal neuralgia, butanol treatment, 721
- Trichloropropane, 340
- Triglycerine compounds, 135
- Triphenylethylenic acid, 276
- Tryptophane oxidation, 132
- Tubercle bacilli, lipidic fraction, 193, 205
- Tuberculin, 208
- Tuberculosis, 203
- Tularemia, 197
- Tumors, see also cancer, different agents
  - and calcium, 359
  - and chloride content, 312, 710, 716
  - and cholesterol, 370
  - and conjugated fatty acids, 322

- Tumors and copper**, 111, 360  
 — and cytolytic activity, 691  
 — and defense, 212  
 — and dualism pain, 101  
 — encephaloid transf., 352  
 — and ethyl mercaptan, 333  
 — and fatty acids, 312, 313, 326, 332, 466, 473, 533, 703 710, 715  
 — fibrangiomas, 295  
 — and glycerol, 365  
 — grafts in humans, 214  
 — growing, 40  
 — hemangiomas form, 401  
 — and heptanol, 384  
 — and immunity, 214-220  
 — and iron, 400  
 — induced, see carcinogenesis  
 — and linoleic acid, 315  
 — lipids and lipoids, see specific substances  
 — and magnesium, 355  
 — and manganese, 360  
 — massive, 653  
 — and mercaptans, 332, 477  
 — and methyleholanthrene, 300, 373  
 — and molybdenum, 399  
 — multiple, 270  
 — necrotic and non-necrotic, 160  
 — and OH fatty acids, 326, 710  
 — papilloma, 292  
 — and potassium, 396  
 — and radiation, 261, 262, 524, 683, 726  
 — and sterols, 148, 168, 369-373, 466, 715  
 — and sulfur, 336, 346, 422, 481, 491  
 — see also specific agents  
 — and sulfur mustard, 346  
 — ulcerated, 333, 653  
 — and unsaponifiable fractions, 306, 372, 468  
 — and viruses, 290-301  
 — Walker's, 209, 326, 401, 608, 625, 653  
 — and zinc, 401  
**Tung oil**, 320  
**Turpentine oil**, 345  
**Twin formation**, 271, 627  
 — in carcinogens, 271  
 — methyleholanthrene, 273  
**Types of offbalance**, see offbalance A and D  
 — carcinogenic effect, 290  
**Typhoid**, 197, 201, 218  
**Typhus**, 197  
**ULCERATION** as homotropic process, 224  
 — and lipids, 160, 333, 653  
**Ultra-violet irradiated bacteriophage**, 299  
 — ray burns, 427  
**Unsaponifiable fractions as antifatty acids**, 371  
 — and anuria, 427  
 — and blood, 662  
 — and cancer, 306, 372  
 — and cancer therapy, 468, 533  
 — clinical effects, 371, 372, 373  
 — convulsions, 448  
 — cytolytic activity of sera, 694  
 — fractionation, 623  
 — of liver, 533  
     origin of, 371, 372  
     of organs, 468  
     and pain, 422  
     of placenta, 468  
     pharmacology, 371  
     and radiation, 256  
     and regeneration, 658  
     and rouleaux, 679  
     and shock, 372, 680  
     and transplants, 210  
     and viruses, 297  
**Unsaturated nonpolar group in rancidity**, 129  
     fatty acid, see fatty acids  
     and red cells, 667  
**Ureoselic nitrogen metabolism**, 596  
**Urethane and carcinogenesis**, 276, 307, 689  
**Ureoselic nitrogen metabolism**, 596  
**Urine analyses**, 93, 102, 132, 313, 317, 386, 532, 555, 584, 590  
     calcium excretion index, 532  
     chloride, 166, 532, 595  
     different substances, 86  
     collection, see specific agents  
     excretion and retention index, 532  
     glucuronic acid, 641  
     oxidoreduction potential, 86, 89, 590  
     oxidizing substances, see peroxides  
     patterns, 90  
     peroxides, 89, 132, 254, 419, 525, 683  
**Urine pH**, 46, 90, 368, 532, 557  
     and blood titrimetric alkalinity, 555  
     specific gravity, 86, 415, 532  
     sulfhydryl, 166, 573, 595  
**Urinary surface tension**, 86, 102, 152, 532, 536  
     and adrenalectomy, 588  
     in animals, 584  
     and cancer therapy, 533  
     and colloids, 590, 648



- Urinary surface tension and environmental temperature, 652  
 — — — experimental research, 589  
 — — — heptanol, 385  
 — — — nature of factors, 580  
 — — — in normal physiology, 581  
 — — — and old age, 419, 646  
 — — — in pregnancy, 588  
 — — — and radiation, 257, 524, 683  
 — — — and stone formation, 648  
 — — — technical problem, 575  
 — — — urotensimeter, 578
- VACUOLES in brain cells, 228  
 Vacuolization of red cells, 664  
 Valency bridge, 9  
 Valeric acid, 121, 123  
 van der Waals cohesion forces, 24, 119, 377  
 Vapor fractionation of fatty acids, 134, 627  
 Vascular headaches, 423  
 Vascular sclerosis and radiation, 256  
 Vegetative nervous system, 175  
 Verruga peruviana, 295  
 Vertigo as an acid-base symptom, 61  
 — patterns, 69, 428  
 — treatment, 428  
 Virus and cancer, 290-301  
 — and clupanodonic acid, 317  
 — and conjugated fatty acids, 322  
 — constitution, 690  
 — encephalitis, 654  
 — fatty acids and anti-fatty acids, 296  
 — and glycerol, 364  
 — and hormones, 301  
 — and the host, 295  
 — infection in children, 156  
 — lipids and temperature, 654  
 — and lipoids, 296, see also specific agents
- Virus pathogenicity  
 — place in organization, 26, 690  
 — plural activity, 293  
 — and seasonal changes, 297  
 — and tumors, 290-301  
 — two types, 290  
 Vitamins A, B<sub>1</sub>, B<sub>2</sub>, B<sub>6</sub>, D, E, K and S.d.c. pH, 604  
 Volcanoes, 108
- WALKER tumor, 326  
 — — and lipids, 625  
 — — and S.d.c. pH, 608  
 — — variation, 653  
 — — and zinc, 401  
 Water circulation and organization, 30  
 — excretion, 166  
 — and nitrogen metabolism, 595  
 Wheal resorption, 83, 119  
 — — in abnormal condition, 566  
 — — and old age, 419  
 Widows and cancer, 308  
 Wounds, see also S.d.c. pH  
 — atonic and oxygen, 406  
 — and chlorides, 211  
 — healing, 161, 658
- X-RAYS, see radiation
- YOUTH characters, 357, 654  
 — — effect of lipids, 165  
 — — persistence, 82, 661  
 Youth and viruses, 156, 654
- ZINC, 359, 401  
 — and calcium, 356  
 — and copper, 359  
 — in periodic chart, 105, 394  
 — pharmacology, 401  
 — and testes teratomas, 298  
 — and various effects, 401