shore bar," but on another uses the same term for any one of a series of normally submerged bars found at increasing depths on and seaward from a gently sloping beach. Ph. H. Kuenen's *Marine Geology* (*4*) seems to use "offshore bar" only in the Johnsonian sense, but repeats Shepard's figure (*3*, Fig. 33; *4*, Fig. 121) in which a bar is shown in the offshore zone of the beach without providing a specific qualifying term for such a bar. Kuenen's contribution to the confusion in the use of "offshore bar" is to term some of them "sandbanks" (*4*, 270, and Fig. 124), thus attempting to appropriate for a specific technical meaning a term long in wide common use for any kind of sandy beach, dike, or levee. Kuenen's "sandbank" is the ridge in the "low and ball" topography. Such bars have lately been termed "longshore bars" by Shepard (*5*).

The following terminology is proposed to correct the ambiguity and double uses noted:

1. *Offshore bar*: any normally submerged bar formed offshore in marine or fresh waters, found chiefly in the littoral zone. It includes, among other bars, the ridges of the low and ball topography that have been called "sandbanks" by Kuenen and "longshore bars" by Shepard, the latter being here preferred. To term such a ridge a "sandbank" has no more distinctiveness than to call it a "ball."

2. *Barrier island*: the island, or chain of islands of sand, or sand and gravel or shingle, lying offshore on a gently sloping shallow bottom. It is separated from the shore by a coastal lagoon or "sound." Its beach is the main line of resistance of the land to the attack of the major waves of the offshore region, the beach slope forming a profile of equilibrium. The term is used technically and includes, as a single barrier island or *barrier island chain*, such segments in the same alignment as may be separated by tidal inlets or other tidal openings. This barrier is commonly tied to land at one or both ends, either to a stream delta or to a headland of some other origin, as an erosional projection of a drowned coast. The segments of the island or chain may include spitlike peninsulas, the difference between spit and spitlike segment of a barrier island being one of size and individual usage, as in the case of hill and mountain. Synonyms: Barrier beach, offshore bar (Johnsonian sense), and barrier sand island. The term "barrier beach" is not favored because many barrier islands are much more than beaches, being widened by washover fans, tidal deltas, and eolian plains and prograded to form extensive beach plains and cuspate forelands.

3. *Barrier reef*: an organic, commonly partly coralline reef lying offshore from a continent or island much in the position of the barrier island of sand. It includes barrier reefs of islands—commonly volcanic—and such great barrier reefs as that of the northeastern Australian coast. The terminology of coralline reefs is fairly well stabilized and has recently been summarized, with some additions, by Kuenen (*4*, 423–26).

It seems remarkable that our geological terminology is as well organized as it is in view of such obstacles as (1) the characteristic use in English of one word in multiple meanings, (2) the incompleteness in scope of our scientific dictionaries, (3) the general brevity and sketchiness of book indices, and (4) the relative scarcity of detailed treatises of the scope of Grabau's *Principles of Stratigraphy* and Twenhofel's *Treatise on Sedimentation,* in contrast with the abundance of textbooks suitable for review in a one- or two-semester course of graduate or undergraduate instruction. Some of these shorter textbooks of geology present somewhat individualistic terminologies.

References

1. JOHNSON, D. W. *Shore Processes and Shoreline Development.* New York: Wiley (1919).
2. PRICE, W. A. *J. Geomorphol.,* **2**, 357 (1939).
3. SHEPARD, F. P. *Submarine Geology.* New York: Harper (1948).
4. KUENEN, PH. H. *Marine Geology.* New York: Wiley (1950).
5. SHEPARD, F. P. *Tech. Memo. 15.* Beach Erosion Bd., U. S. Army C. of E. (1950).

A Device for Air Evacuation from an Autoclave Sterilizer

Chen Lu-ao

Department of Biochemistry,
National Defence Medical Center,
Taipei, Taiwan, China

In employing autoclave sterilization, it is best to have the substance to be sterilized entirely exposed to steam. If some air is allowed to remain in the chamber of a sterilizer, incomplete sterilization will result.

Obviously, devices for displacement of air have always been taken into consideration, as seen in the construction of almost all sterilizers. The most common ones are the vacuum and the sensitive thermal devices. The former, however, produces only partial vacuum and is time-consuming, and the latter fails to remove that part of air which has mixed with steam. The present device (Figs. 1–4) has been found satisfactory in actual practice.

As the density of steam is smaller than that of air ($18/22.4 < 29/22.4$), and its temperature much higher ($100° > 20°$ C), the ratio of their densities becomes all the greater ($293 \times 18/373 \ll 29$). So as soon as steam is led into the jacket and the chamber, its natural tendency will be to rise and occupy the upper part of the chamber, and the air already there will be pressed to the lower part. Under such circumstances, the supersaturated steam becomes so unstable that it separates into small droplets when it diffuses downward into the dead air space. Likewise, as a result of upward diffusion, the air loses its mixing effect with the steam owing to the condensation of the latter.

If the steam pressure is not high (< 3 psi), and a baffle plate is placed in front of the inlet, the phenomenon of eddy current will be avoided. In this case, the air and steam will not be a mixture, but separate layers, each of which possesses a uniform tempera-

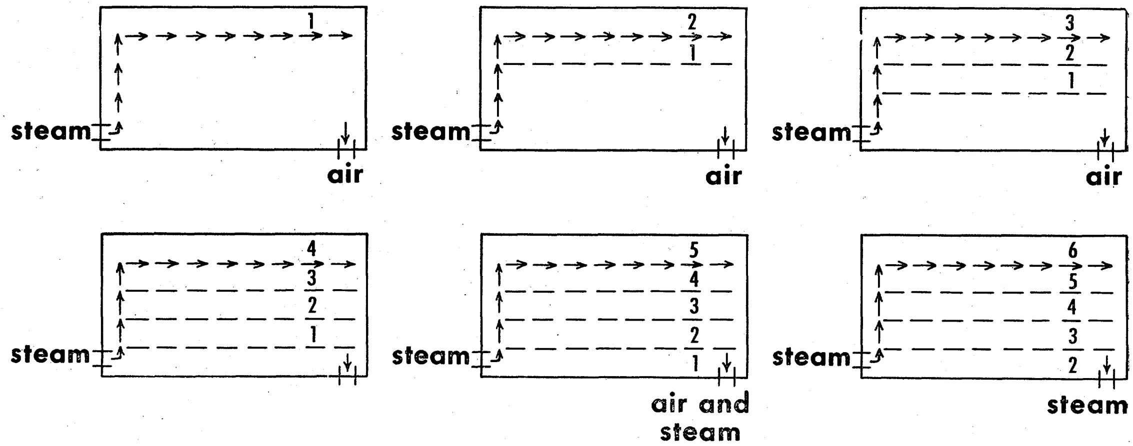

Fig. 1

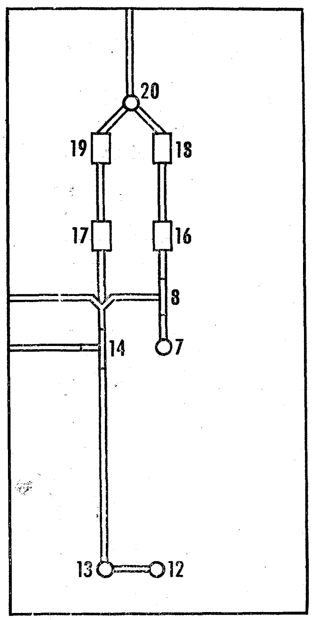

Fig. 2 (Bottom view)

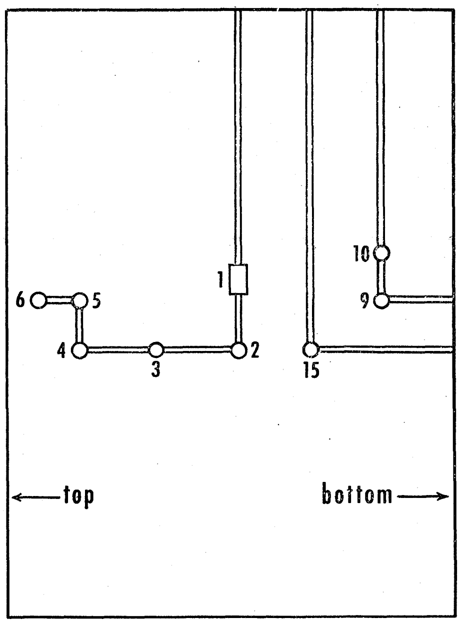

Fig. 3 (Left side)

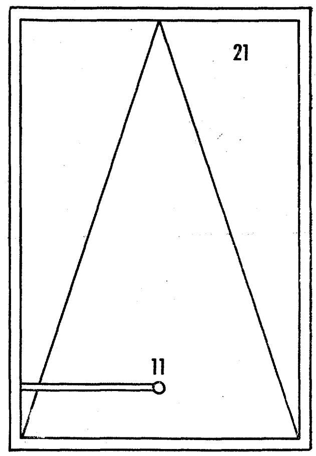

Fig. 4 (Rear view)

Explanation of figures

1. Steam strainer
2. Valve (steam to jacket)
3. Reducing valve
4. Jacket pressure gauge
5. Safety valve
6. Jacket steam inlet
7. Jacket steam and condensate outlet
8. T-tube
9. Valve (steam to chamber)
10. Chamber pressure gauge
11. Chamber steam inlet
12. Chamber steam and condensate outlet
13. Thermometer
14. T-tube
15. Exhaust-valve
16, 17. Strainer
18, 19. Steam trap
20. Draining pipe
21. Baffle plate

ture, and the air will occupy the lowest portion of the chamber. Hence, if the inlet for steam is on the top (or lower back) and the outlet on the bottom (or bottom front), it will be in the best condition for the incoming steam to displace the dead air. Our present device is based on this principle.

In order to avoid eddy current, lead steam slowly into the jacket to press the air originally there into the chamber (Figs. 2, 3, and 4). When all the air is thus displaced, the steam begins to flow into the chamber. In the same way, the steam soon expels all the air out of the chamber through the exhaust valve. This is observed when the temperature at the outlet (13) is approximately equivalent to the chamber pressure (10) (i.e., 2–3 psi $\sim$ 212–215° F). (Analysis shows that air mixed in steam is less than 0.1/100.) Now close the exhaust valve and set the autoclave sterilization in operation as usual.

For free-flowing steam sterilization, the steam pressure is adjusted between 1 and 2 psi, and the steam is allowed to flow continuously through the jacket, the chamber, and out the exhaust valve. With this simple operation, the temperature in the chamber can easily be maintained at 100° C.

This device is superior in the following ways:

1. The process of displacing air is simple, quick, and complete.
2. The temperature in both the jacket and the chamber is uniform and the performance perfect.
3. It can also be used for free-flowing steam sterilization.

An Enzyme in Endocrine Tissues which Oxidizes Δ^5-3 Hydroxy Steroids to α,β Unsaturated Ketones[1]

L. T. Samuels, M. L. Helmreich, M. B. Lasater, and H. Reich

Department of Biological Chemistry, College of Medicine, University of Utah, Salt Lake City

All the most active C_{19} and C_{21} steroid hormones contain the Δ^4-3-one structure in ring A. They have been found in the tissues of origin: thus, testosterone has been isolated from testes (*1, 2*), progesterone from corpus luteum (*3, 4*), and cortical steroids from the adrenal cortex (*5, 6*). Cholesterol and Δ^5-3-ol intermediates are presumed to be precursors of the active hormones. Various tissues were investigated for an enzyme that would convert the latter type of structure to the α,β unsaturated ketone. Placental tissue, corpus luteum, interstitial cells of the testis, and the adrenal cortex were found to be very active, but several other tissues examined showed no effect.

The strong absorption band at 238–240 mμ given by the α,β unsaturated ketonic structure was used for routine measurement of its formation. For the incubations, 2 μM of dry steroid were placed in each incubation flask. The steroid was then dissolved in 1 drop of propylene glycol. Weighed portions of the thinly sliced tissues were washed into the flasks with 15 ml of a solution made up of 1 part of homologous serum and 2 parts phosphate buffer, pH 7.4. The flasks were then brought into equilibrium with an atmosphere of 95% oxygen and 5% CO_2, and incubated for 2 hr. A temperature of 37.5° C was used for all tissues except testis; the latter was incubated at 33° C. Δ^5-Pregnene-3β-ol-20-one was incubated with ovarian follicles, corpora lutea, and adrenal cortex of cattle; cryptorchid testes stimulated with chorionic gonadotrophin, placentae, pregnant uterus, and liver of rats; and three types of tumors of mice. Δ^5-Dehydroepiandrosterone was also incubated with the stimulated cryptorchid testes of rats. The results of the incubations are shown in Table 1. It is obvious that only those tissues that normally form hormones with the α,β unsaturated ketonic structure contained the enzymes. Diphosphopyridine nucleotide appears to be an effective hydrogen acceptor in the oxidation.

TABLE 1

FORMATION OF α,β UNSATURATED KETONES BY VARIOUS TISSUES *in Vitro*

Tissue	Steroid	α,β Unsaturated ketone formed (μM/g/hr)	
		Serum	Serum + 6 μM DPN
Cryptorchid testes, rat (2 testes/flask)	Δ^5-Pregnenolone	0.15 (0.10–0.23)	0.33 (0.31–0.34)
Corpus luteum, cow	"	0.29 (0.25–0.36)	1.00 (0.68–1.34)
Ovarian follicle, cow	"	0	0
Adrenal tissue, cow	"	0.23 (0.21–0.25)	0.76 (0.74–0.81)
Leukemia, lymphosarcoma, mammary carcinoma, mouse	"	0	0
Placental tissue, rat	"		0.19 (0.18, 0.20)
Pregnant uterus, rat	"		0
Liver, rat	"	0	0
Cryptorchid testes, rat	Δ^5-Dehydroepiandrosterone	0.11 (0.06–0.14)	0.32

Since other types of conjugated double bond systems give absorption bands in the same region of the ultraviolet spectrum, an isolation was carried out to establish the structure of the compounds formed in the reaction. Material was isolated after Δ^5-pregnene-3β-ol-20-one had been incubated with cryptorchid testes. The infrared spectrum was that of progesterone. The dinitrophenylhydrazone had the same melting point as progesterone bisdinitrophenylhydrazone. It therefore appears that those tissues which form

[1] This investigation was supported in part by grants from the National Cancer Institute of the National Institutes of Health, U. S. Public Health Service, and from Ciba Pharmaceutical Products, Inc., Summit, N. J.