Cardiovascular Physiology

Introduction

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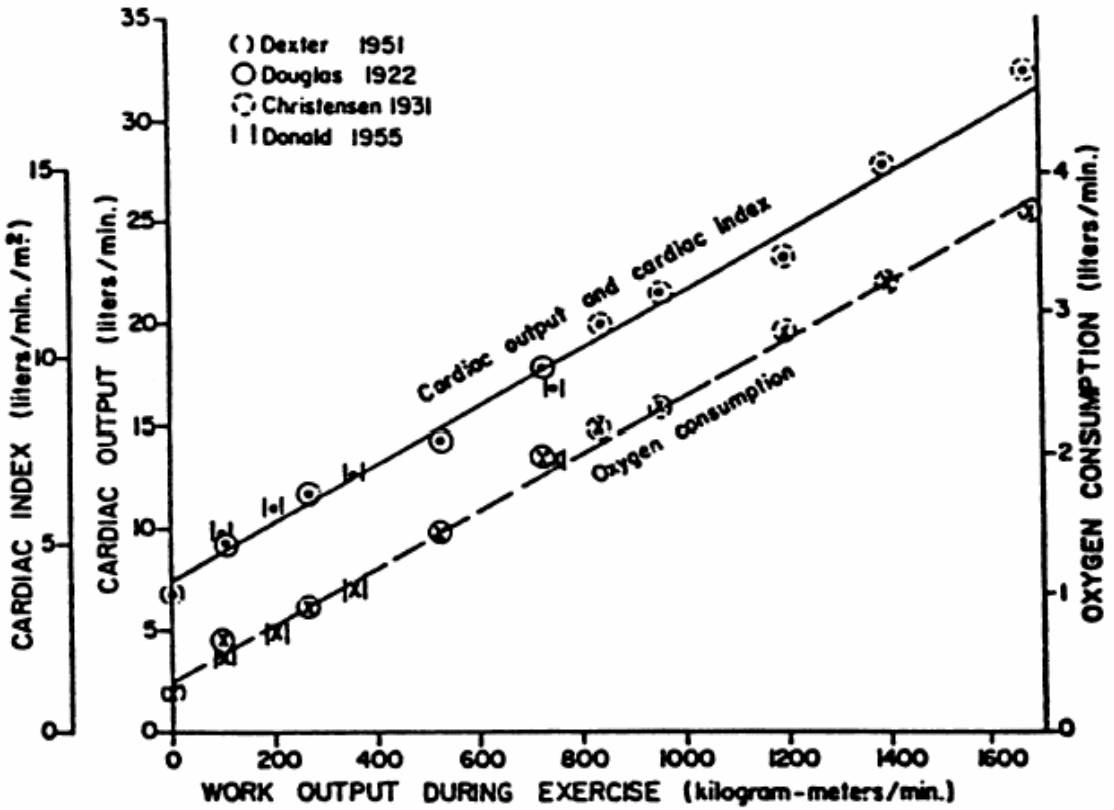
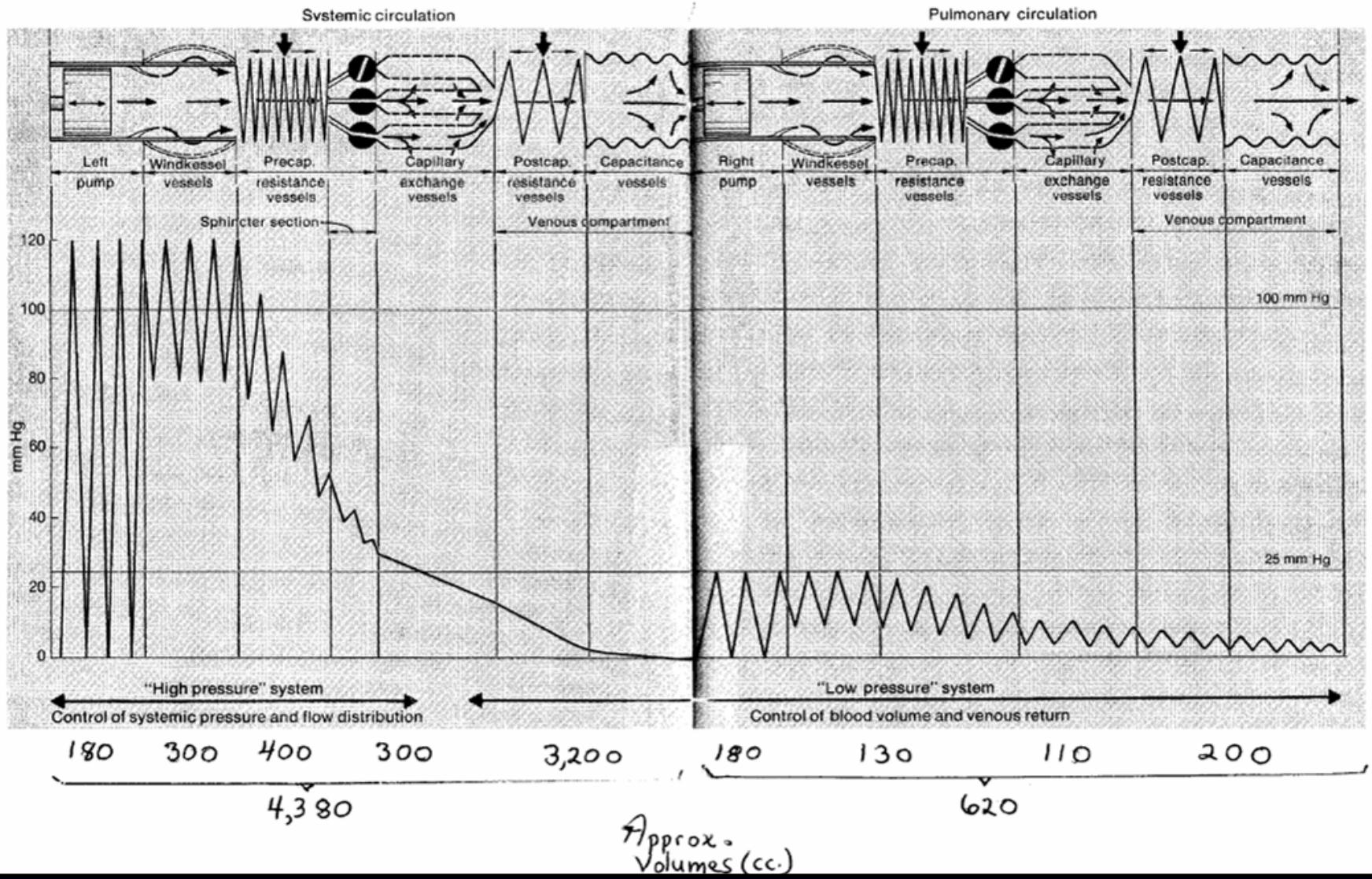
- **Communication**: hormones, antigens-antibodies
- **Heat Exchanger**: via skin, lungs. Controls dissipation.
- **Protection**: clotting, antibodies, WBCs

Cardiac Output and O_2 Consumption



Relationship between cardiac output and work output (solid curve) and between oxygen consumption and work output (dashed curve) during exercise. [Data derived from studies by Douglas and Haldance (1922); Christensen and Mitteilung (1931); Dexter, Whittenberger, Haynes, Goodale, Gorlin, and Sawyer (1951); and Donald, Bishop, Cumming, and Wade (1955).]

CV System: Series Connection



CV System: Parallel Connection

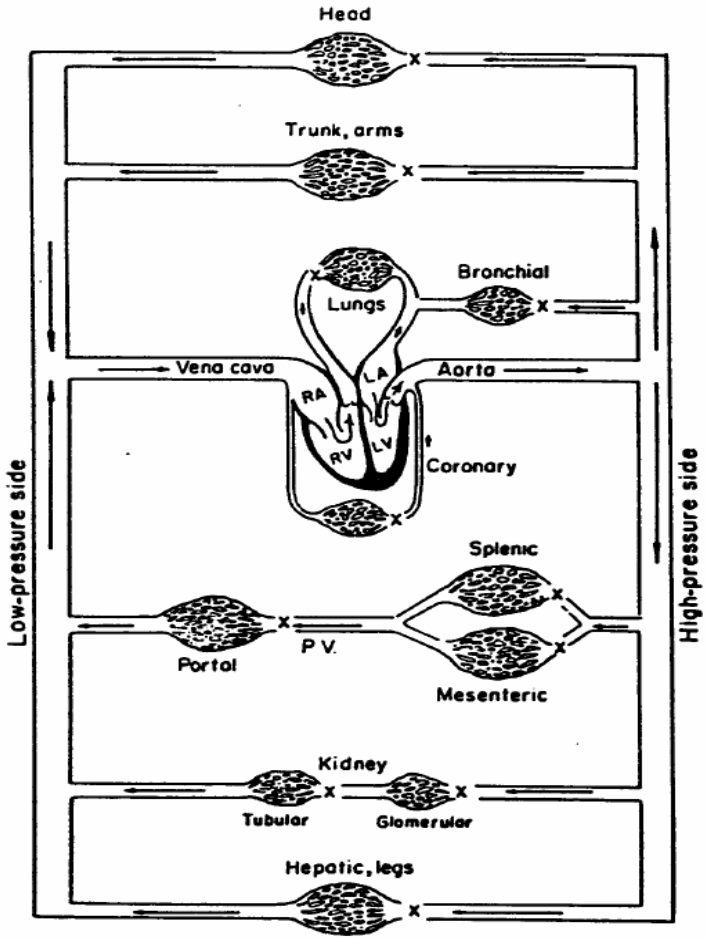
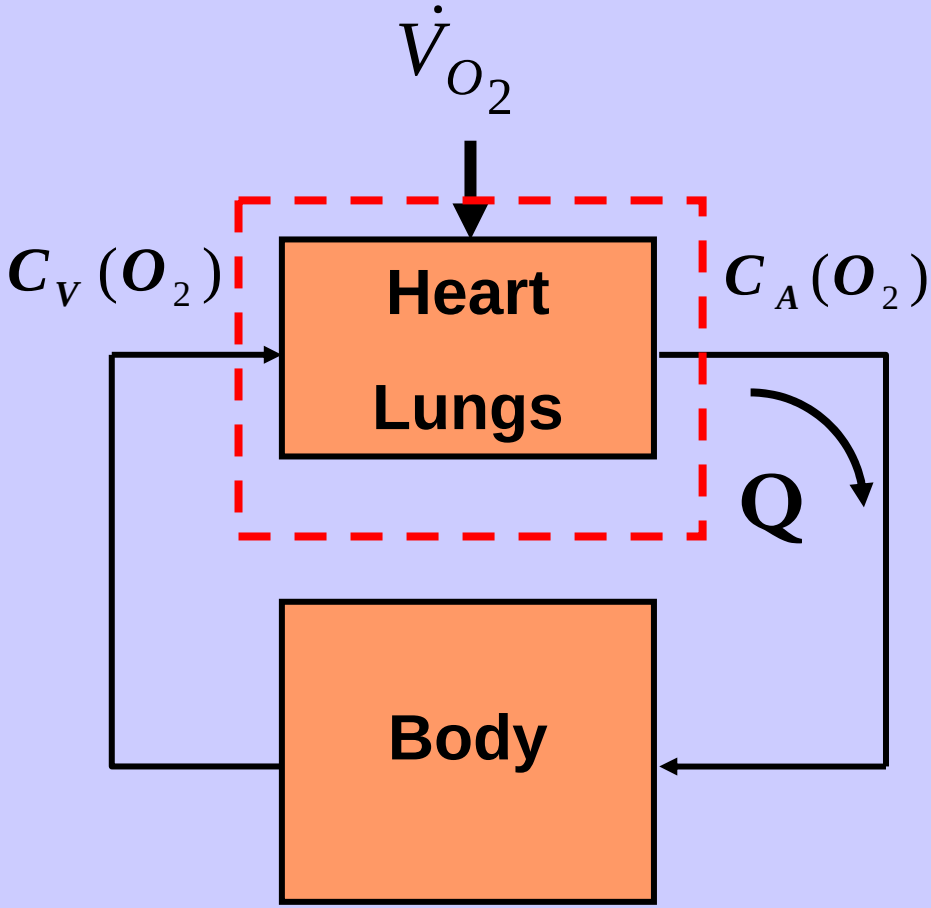


Figure 3: Arrangement of the parallel routes by which the circulation passes from the aorta to the vena cava. Representatives of the different categories of route discussed in the text are indicated. The Xs indicate the location of control points where arterioles may control the flow. *RA*, right atrium; *LA*, left atrium; *RV*, right ventricle; *LV*, left ventricle; *PV*, portal vein. (from Green, H.D.: Circulation: Physical Principles, in Glasser, O. [ed.]: *Medical Physics*, Vol. 1 [Chicago: The Year Book Publishers, Inc., 1949], p. 210. Original illustration kindly furnished by H.D. Green.)

Conservation of Mass and Cardiac Output (Fick method)



$$Q = \frac{\dot{V}_{O_2}}{C_A(O_2) - C_V(O_2)}$$

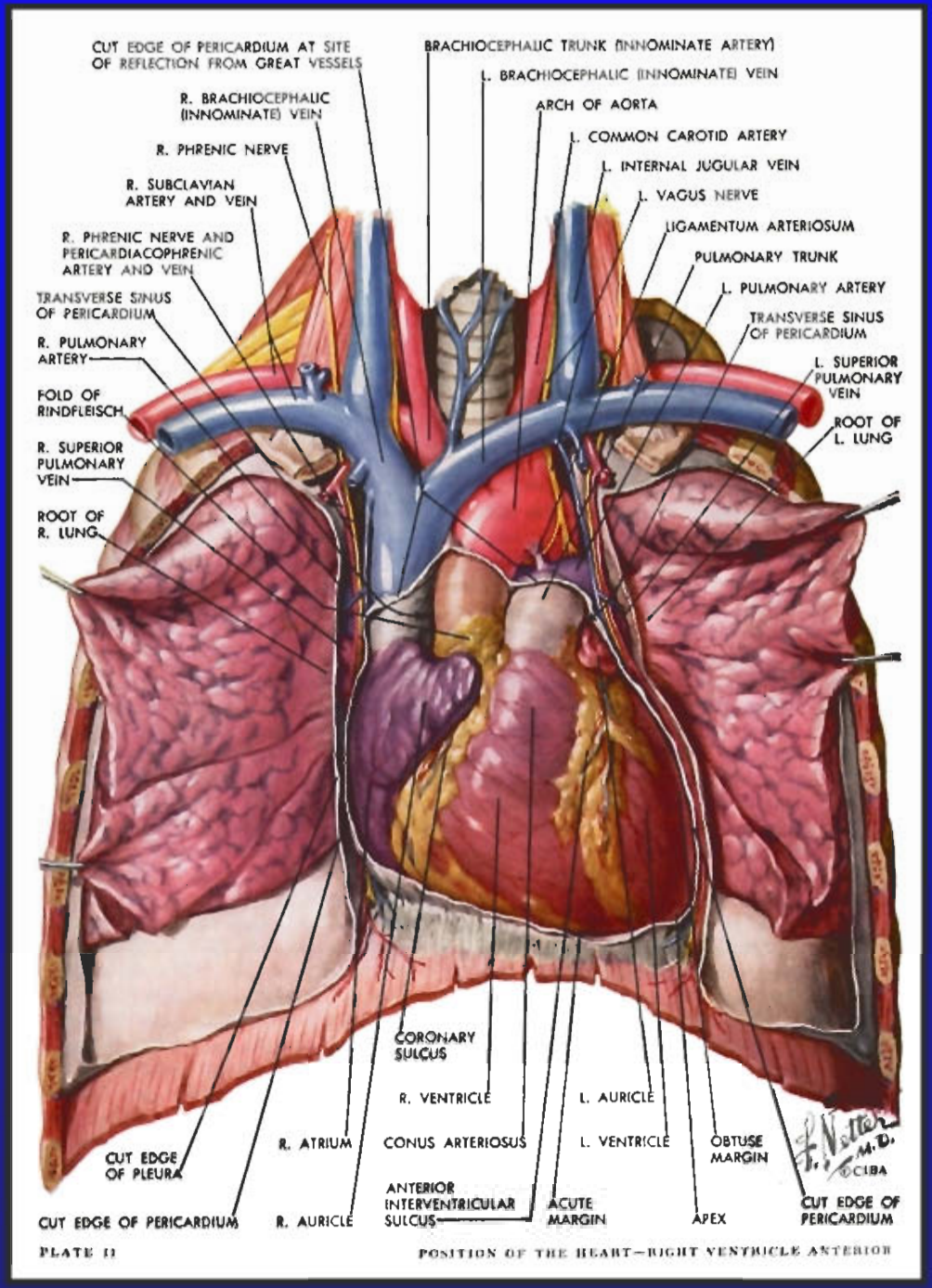
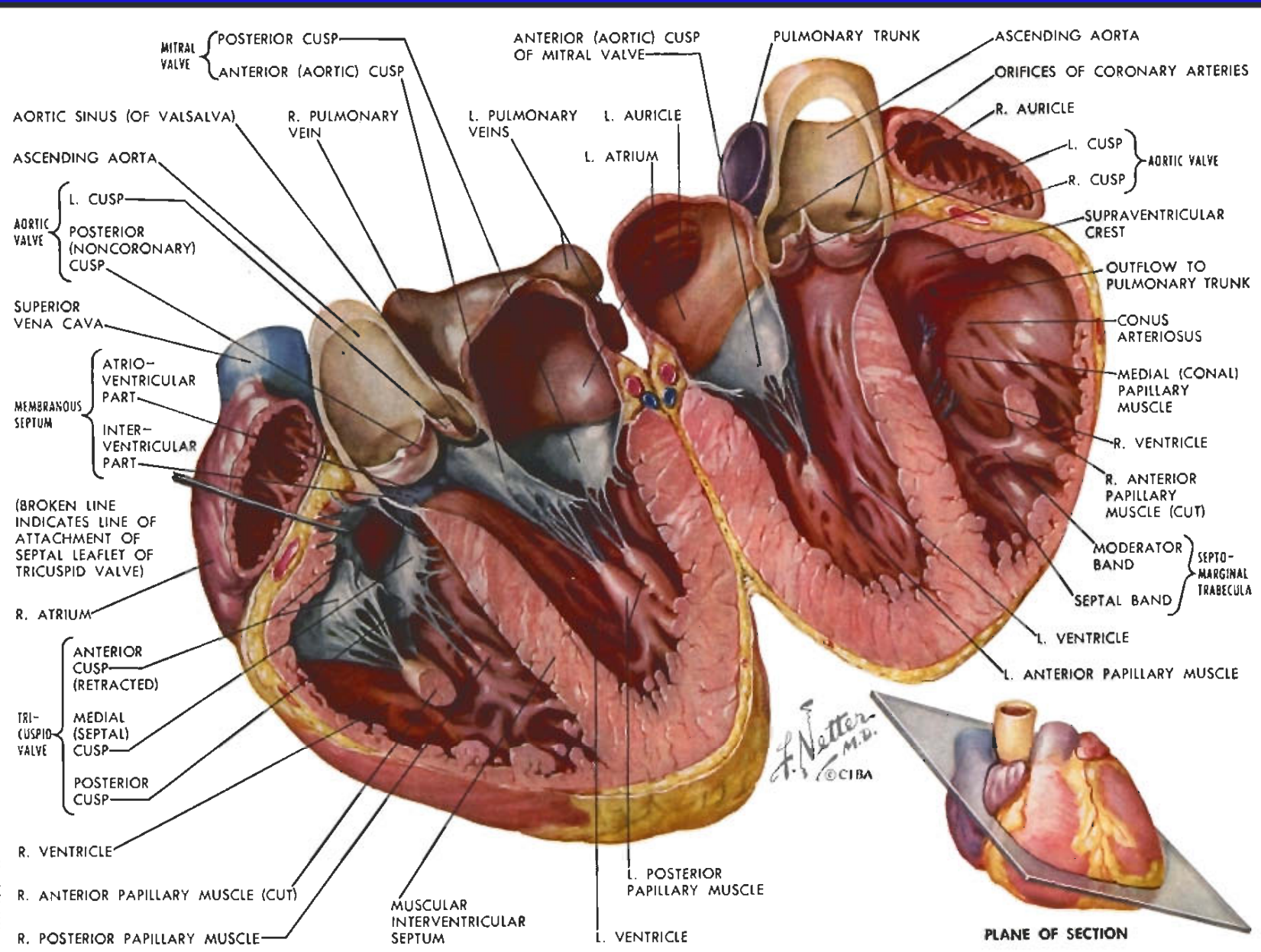


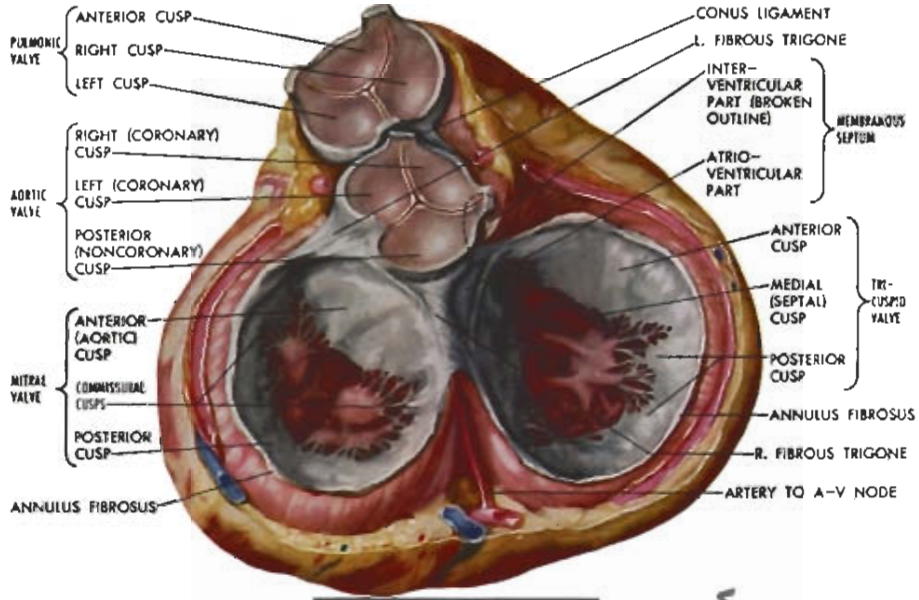
PLATE 11

POSITION OF THE HEART—RIGHT VENTRICLE ANTERIOR

PLATE VIII

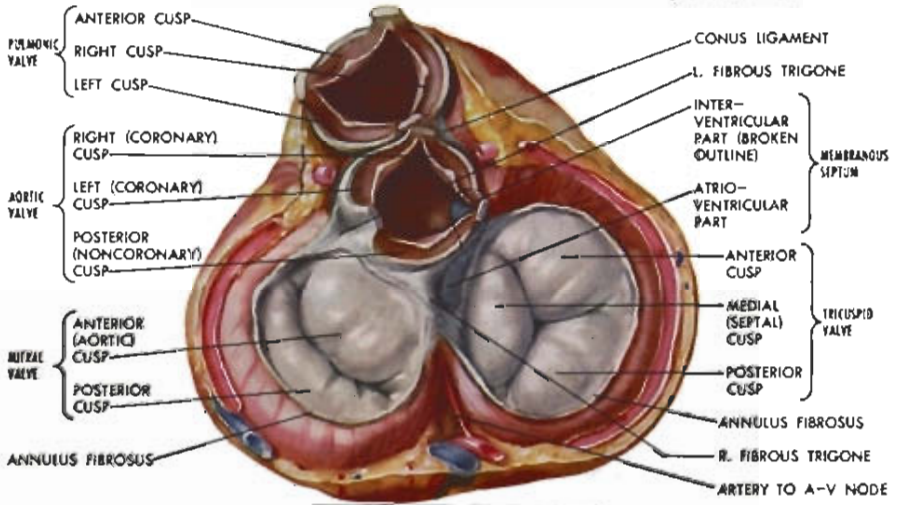
SECTION THROUGH HEART SHOWING ALL CHAMBERS



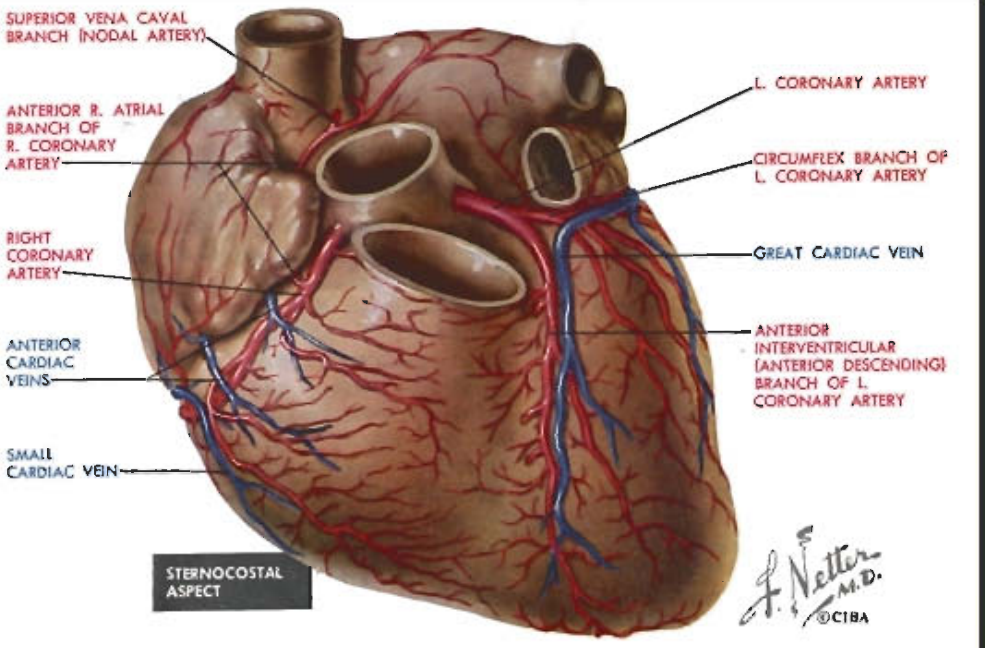


THE HEART IN DIASTOLE: VIEWED FROM BASE WITH ATRIA REMOVED

F. Netter M.D. ©CIBA



THE HEART IN SYSTOLE: VIEWED FROM BASE WITH ATRIA REMOVED



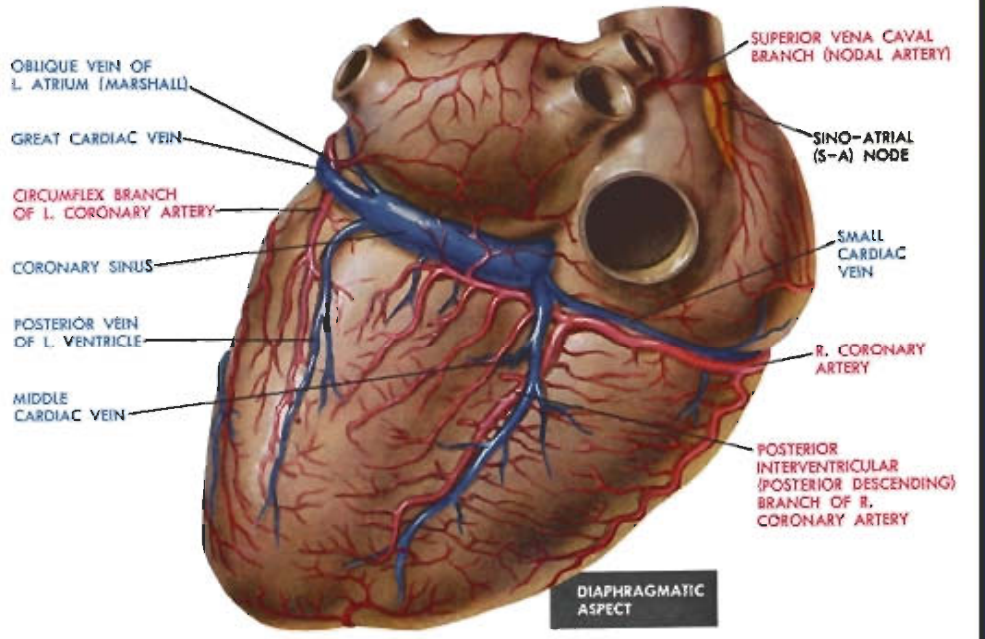
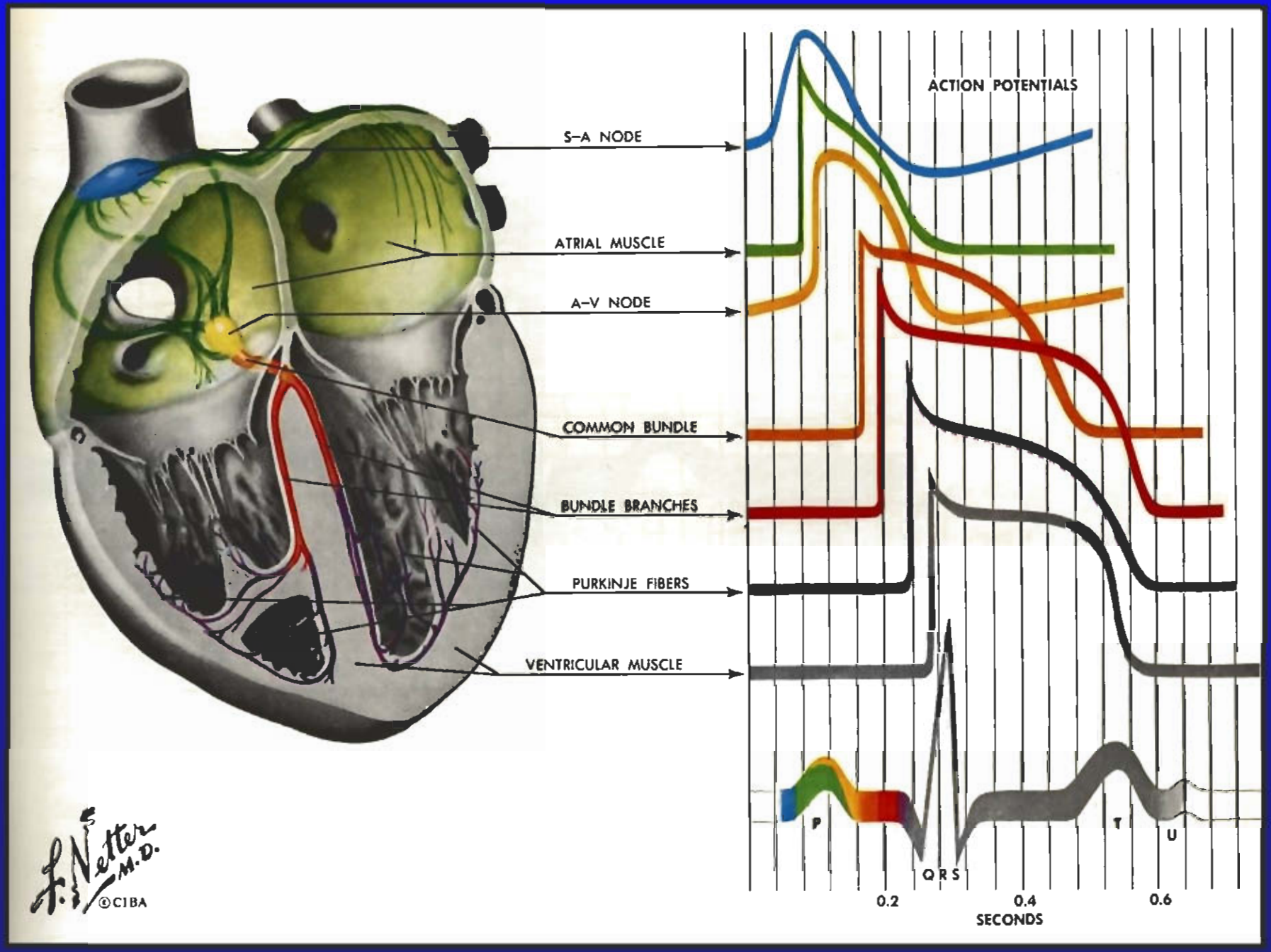


PLATE XI

ARTERIES AND VEINS OF THE HEART


S–A NODE
ATRIAL MUSCLE
A–V NODE
COMMON BUNDLE
BUNDLE BRANCHES
PURKINJE FIBERS
VENTRICULAR MUSCLE
ACTION POTENTIALS
P
Q R S
T
U
0.2
0.4
0.6
SECONDS
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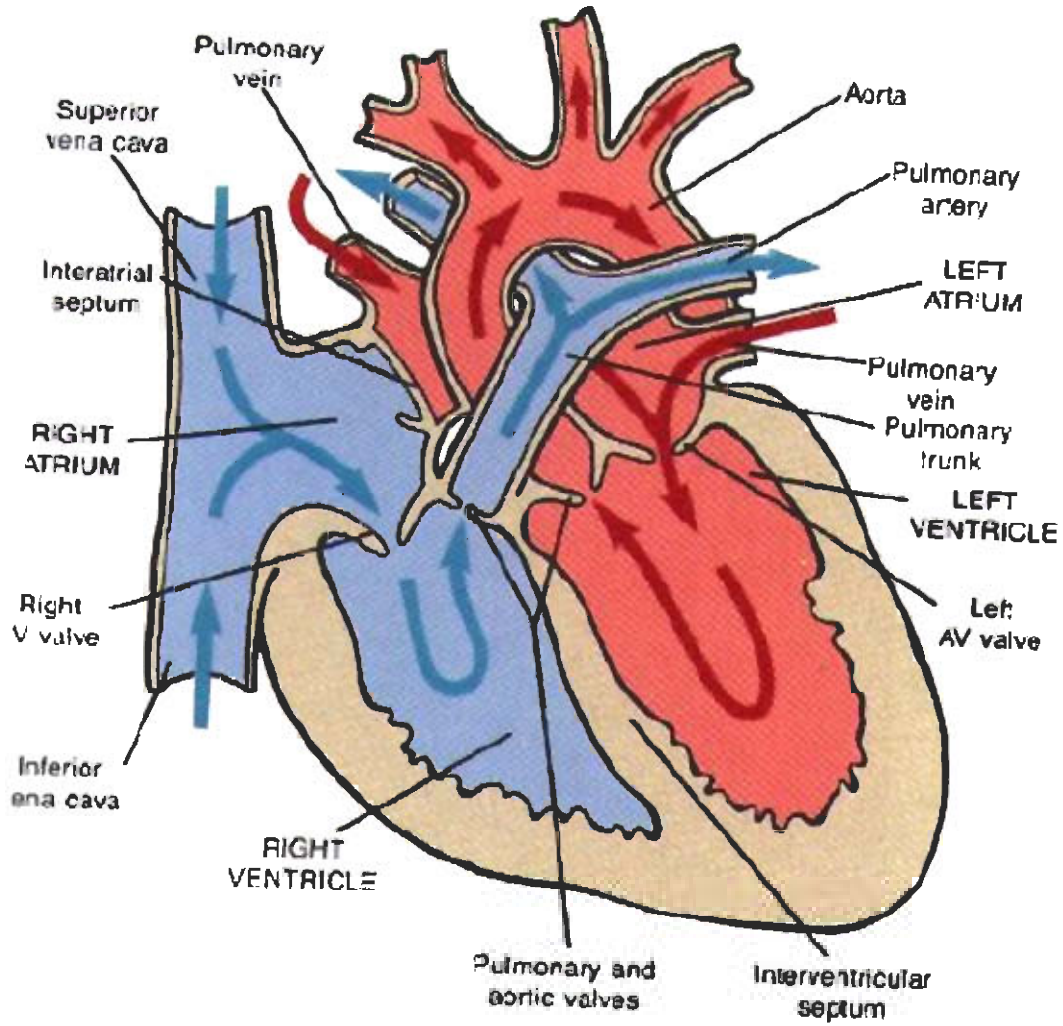
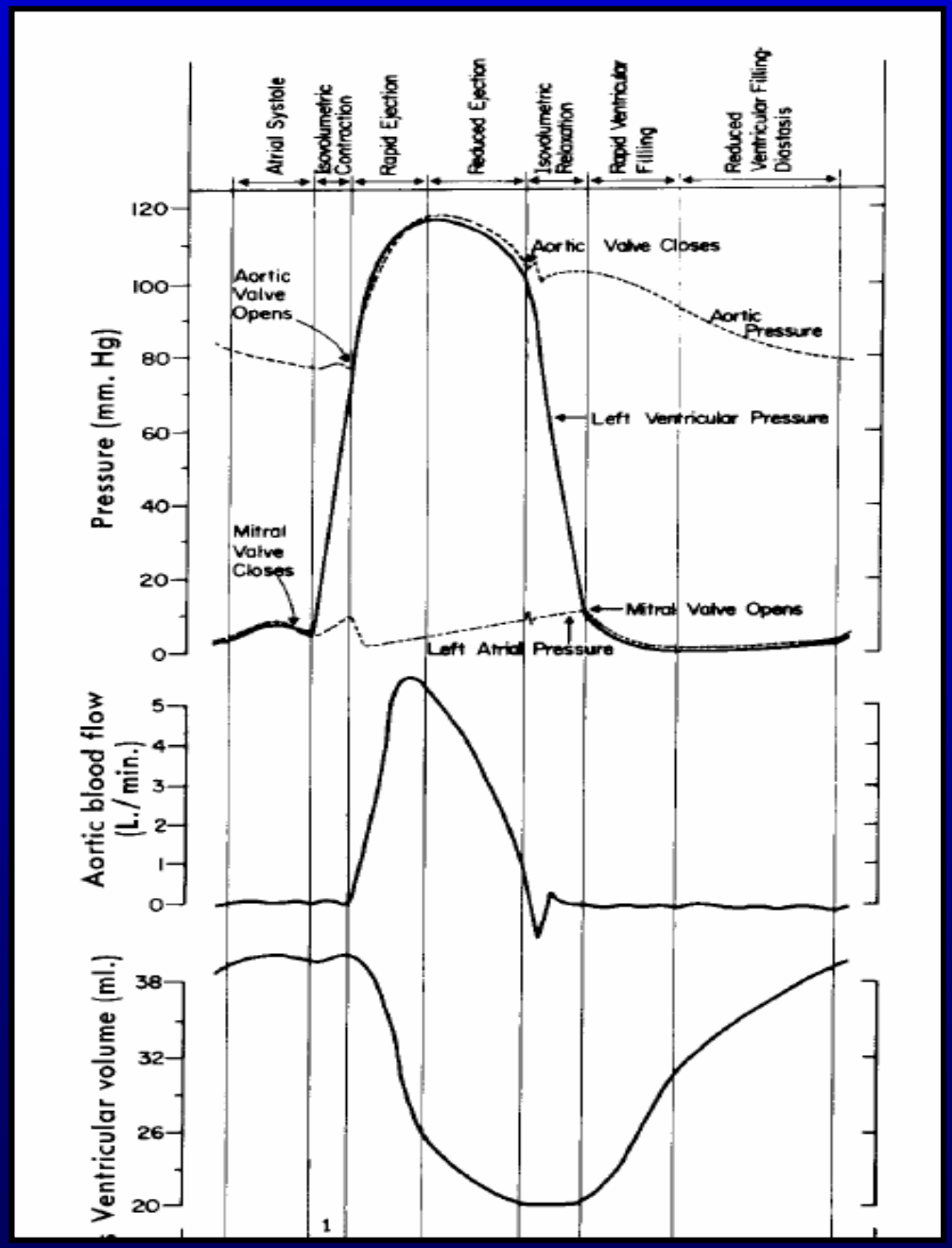
Blood Flow Through The Heart



CARDIAC CYCLE



The Cardiac Cycle

http://www-medlib.med.utah.edu/kw/pharm/hyper_heart1.html